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REVIEW

OF THE

ONTARIO MINISTRY OF HEALTH
EMERGENCY HEALTH SERVICES
AIR AMBULANCE SERVICE

Submitted by:

Aerodevco Consultants Ltd.

August 21, 1989

90-00026/

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DISCLAIMER

This report is submitted in confidence and reflects the views of the authors formed during the review of the Air Ambulance Service. It does not necessarily reflect the official view or opinions of the Air Ambulance Service.

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ACKNOWLEDGEMENT

The Review Team acknowledges and appreciates the cooperation of the Air Ambulance Service Management, staff, District Medical Directors and Air Carriers who on short notice provided documentation and interviews.

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EXECUTIVE SUMMARY

The Ministry of Health's concern about public confidence in the Emergency Health Services' Air Ambulance Service in the wake of recent aircraft accidents caused it to commission a comprehensive review of the Air Ambulance Service.

The Review Team was provided with terms of reference to determine if the standards and procedures, air carrier contracts, inspection and enforcement procedures, organization, management, staff numbers and qualification and safety record meet the needs of the Service.

The review was conducted in the allotted time of six weeks involving travel to air carrier bases, district Air Ambulance Bases, EHS Toronto Headquarters and to similar services in other provinces and the United States. Interviews were conducted using Focus Group Methodology and one-on-one interviews in person or by telephone.

Previous relevant studies were examined and compared as appropriate to the findings of this review. The MOH arranged for the services of the Transport Canada Aviation Safety Program Branch to provide advice and assistance to the Minister, and to facilitate the Review Team's access to safety data.

A brief from the Ontario Public Service Employees Union was received and reviewed by the Review Team.

The Air Ambulance Service was found to be unique amoung North American Air Ambulance services in its size and complexity, and its safety record is better than the Canadian national average for charter aircraft operations.

The Air Ambulance Service successfully transported 85,000 patients during the period 1981-88 without a patient fatality due to aircraft operations. However, unfortunately flight crew and attendants suffered fatalities in two recent accidents which are still being investigated by the Canadian Aviation Safety Board.

The standards, procedures, air carrier contracts, inspection and enforcement procedures, organization, management, and staff have enabled the Air Ambulance Service to perform as indicated during eight years of intensive growth. However, the growth far exceeds the original projections and it is evident that the time has come for a re-examination of the operational requirements and a re-definition of the resources of the Air Ambulance Service. This should be supported by the development of enabling regulations under the Ambulance Act (1980) Section 22, and be specific to Air Ambulance.

Strategic planning, a system safety management program, human factors studies, and dispatch usage criteria specific to air transportation are required to deal with growth of the service and the changing technological environment in both aviation and medical care.

Although the Review Team did not conduct a comparison of the existing contracted Air Ambulance Service with one utilizing MOH owned and operated aircraft, it found no reason to conclude that such an alternative should be studied.

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DEFINITIONS

Dedicated:	aircraft positioned at bases which have been allocated for exclusive operation as air ambulances, and have interiors that are modified and fitted to accommodate patients, health care staff, and specific advanced life-support equipment.
Charter:	aircraft which have had to satisfy pre-qualification conditions in such areas as regular inspections, minimum standards for operation, and the provision of basic medical and survival equipment.
EMCA:	as defined in S1 of Regulation 14.
Attendant:	person providing escort to a patient and who may not have received any medical and/or air orientation training.
Medical Attendant:	person providing escort to a patient who has received EMCA certification and who may not have received any air orientation training.
Ground Ambulance Attendant:	same as medical attendant.
Air Ambulance Attendant:	person providing escort to a patient on Dedicated aircraft and who has received EMCA certification plus partial or full ALS training and air orientation training.
Paramedic:	an EMCA who has received Advanced Life Support training and is certified to perform one or more delegated medical acts. This term is not used in this report.
Cabin Attendant:	as defined in Air Navigation Orders Series VII.
ALS:	Advanced Life Support
AAS:	Air Ambulance Service

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1. BACKGROUND

The Ministry of Health's concern about public confidence in the Emergency Health Services' Air Ambulance Service in the wake of the recent aircraft accidents caused it to commission a comprehensive review of the Air Ambulance Service.

Aerodevco Consultants Ltd. agreed to undertake the review on July 4th, 1989 and to complete the report by August 15th, 1989, a period of six weeks. It was stated as a condition of the review that the Ministry of Health had arranged for Transport Canada (TC) Aviation Safety Programs Branch to act as an advisor to the Minister, and to facilitate the urgent requirement for TC data by the Review Team.

The review team was provided with MOH Terms of Reference by the Manager Air Ambulance Service to determine if the standards and procedures meet the needs of the Emergency Health Services.

1.1 Terms of Reference

The Emergency Health Services (EHS) Air Ambulance Program is to be reviewed to determine if the standards and procedures meet the needs for providing this type of program. Comparison should be made with existing programs in Canada and the USA and with other similar aviation programs. The comparison should include the following points:

1. the standards established by the Air Ambulance section;
2. the methods employed to select companies/organizations for contracting Air Ambulance transportation;
3. the general management system established and employed to oversee the program;
4. the inspection system and enforcement procedures used to monitor the contracted Air carriers;
5. the Air Ambulance staff terms of reference, numbers and qualifications required to manage the program;
6. the role of Transport Canada in (1) and (4); and
7. the safety records 1981 - 1989.

1.2 Description of Air Ambulance Service

The Air Ambulance Service is an integral part of a long-established land Ambulance system which transfers stabilized patients from one hospital to another. Where a land Ambulance cannot reach a critically ill patient at an isolated site or is unable to do so within the time required, an Air Ambulance provides the transportation.

The MOH Ambulance Act and the Health Disciplines Act establish the criteria for patient level of care during transportation to or between medical facilities. Ambulance services are operated by the MOH, private organizations, hospital administrations, Toronto Metro, other municipalities, and volunteer groups with funding from the MOH. All these services are dispatched by the MOH, and in particular the Air Ambulance service is controlled by the Central Air Ambulance Communications Centre (CAACC) which coordinates with land Ambulance dispatch centres throughout the Province. All patient transfers are dispatched in accordance with a priority medical code including non-urgent, scheduled, prompt, and urgent.

In 1988 there were approximately 15,000 patients transported by Air ambulances operated under contract to the MOH Emergency Health Services Air Ambulance Service. The Air Carriers are Dedicated, Chartered, or Scheduled aircraft services. It is normal that ambulatory patients who do not need in-flight medical care are booked on Canadian and International scheduled flights. Patients in need of in-flight care are transported by either dedicated or chartered aircraft and the selection is normally associated with the level of care since Dedicated aircraft are especially equipped for advanced life-support. In 1988 approximately 30 percent of patient transfers were on Dedicated aircraft, 60 percent by Chartered aircraft, and ten percent by Scheduled aircraft. A small percentage of each type of aircraft was involved in the transport of human organs within North America. Neonatal service is also included.

Usage Criteria have been established in conjunction with the OHIP for in and out of province Air Ambulance under the Health Insurance Act in order to obtain insured medical service for the well-being of the patient but which is not available where the patient is located. The transfer to the nearest medical facility is directed by the attending physician, and arranged by the ambulance dispatcher. Several limiting clauses apply under the Health Insurance Act and are specified in the EHS Air Ambulance Information and Utilization Guide.

The Ministry's Dedicated Air Ambulance Program operates out of Buttonville, Timmins, Sudbury, Thunder Bay, and Sioux Lookout. Buttonville commenced operations in 1977 while the four northern bases were inaugurated in 1981. Timmins and Sioux Lookout provide pressurized fixed wing aircraft, and the others provide non-pressurized helicopter services on short haul.

The Dedicated Air Carriers, one operating fixed wing aircraft and the other helicopters are under contract for five years and are selected by means of a request for proposal competitive process. The Chartered Air Carriers are selected through a standing offer contractual process which requires them to provide aircraft and crews on a wet lease standby basis which considers suitability, availability and cost. Charter Air Carriers must satisfy pre-qualification conditions for aircraft, crews, and medical and survival equipment.

Attendants on Dedicated aircraft are MOH employees initially trained and qualified to Emergency Medical Care Assistant (EMCA) criteria under the Ambulance Act, and they are provided additional training for advanced life support (ALS) special care. Also, they are trained in the operation of life support equipment on board aircraft, and are trained in flight safety

techniques to assist patients and hospital personnel. The Attendants on Chartered aircraft are provided either by the Charter Carrier or by the referring hospital and shall be trained as a nurse or EMCA, and be knowledgeable in the transport of patients by Air. The CAACC attempts to match the priority medical code, aircraft type, cost of charter, location, and attendants on charter flights on a 24 hour per day, seven day per week basis.

The growth of the Air Ambulance Service between 1981 and 1988 was from approximately 6,000 patient transfers to 15,000 thousand and now includes 85 heliports and 35 Ontario based Air carriers, 7 US carriers, as well as the five Dedicated bases. Future growth has not been identified by the Air Ambulance Service beyond an expected ten percent in 1989/90.

The EHS management system utilizes an EHS Advisory Committee with a Provincial Air Ambulance Utilization Committee (PAAUC) reporting to it which meets twice per year. The PAAUC has in turn District Hospital Utilization Committees reporting to it which include the EHS District Managers at the Dedicated Bases, which meets four times per year. The committees all include representatives of both the Air Ambulance Service and the medical/hospital facilities. Figure 1 illustrates the Committee Structure.

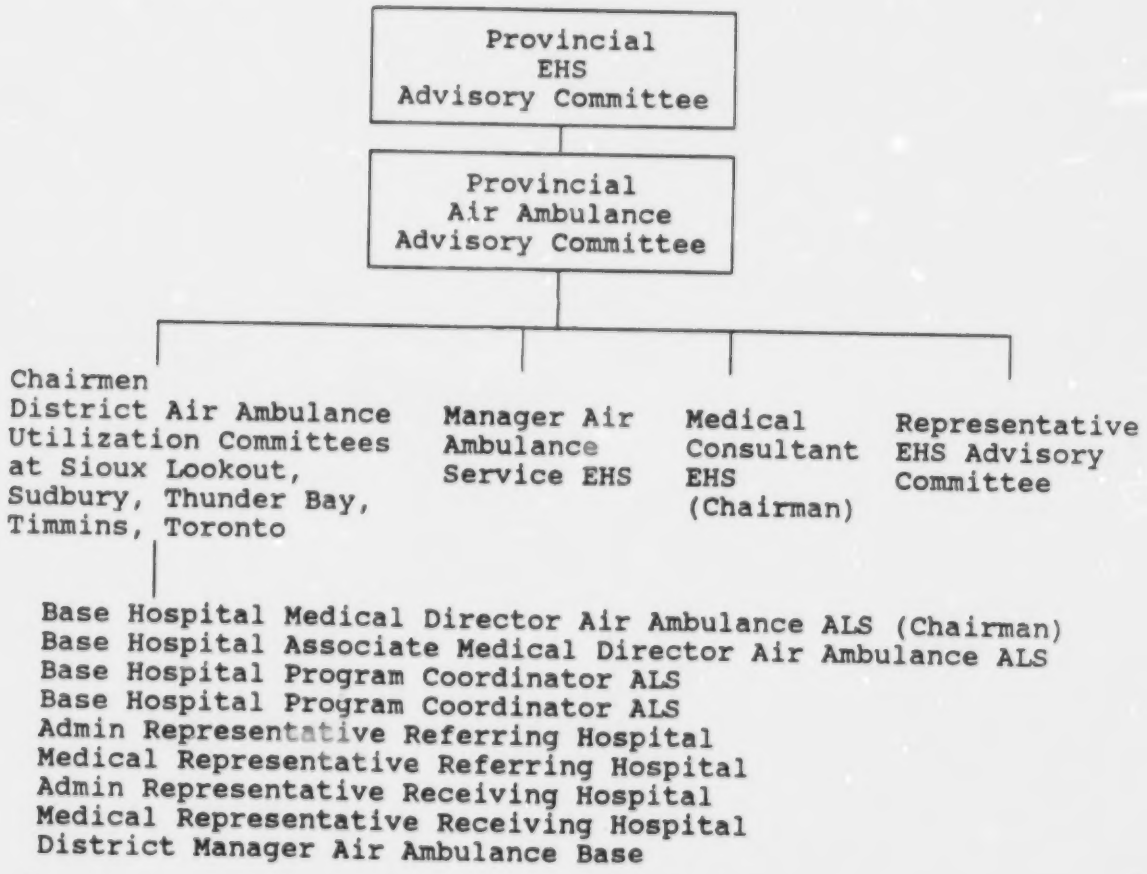
Provincial EHS Advisory Committee
Provincial Air Ambulance Advisory Committee
Chairmen District Air Ambulance Utilization Committees at Sioux Lookout, Sudbury, Thunder Bay, Timmins, Toronto
Manager Air Ambulance Service EHS
Medical Consultant EHS (Chairman)
Representative EHS Advisory Committee
Base Hospital Medical Director Air Ambulance ALS (Chairman)
Base Hospital Associate Medical Director Air Ambulance ALS
Base Hospital Program Coordinator ALS
Base Hospital Program Coordinator ALS
Admin Representative Referring Hospital
Medical Representative Referring Hospital
Admin Representative Receiving Hospital
Medical Representative Receiving Hospital
District Manager Air Ambulance Base

Figure 1. EHS Management Advisory Committee Structure

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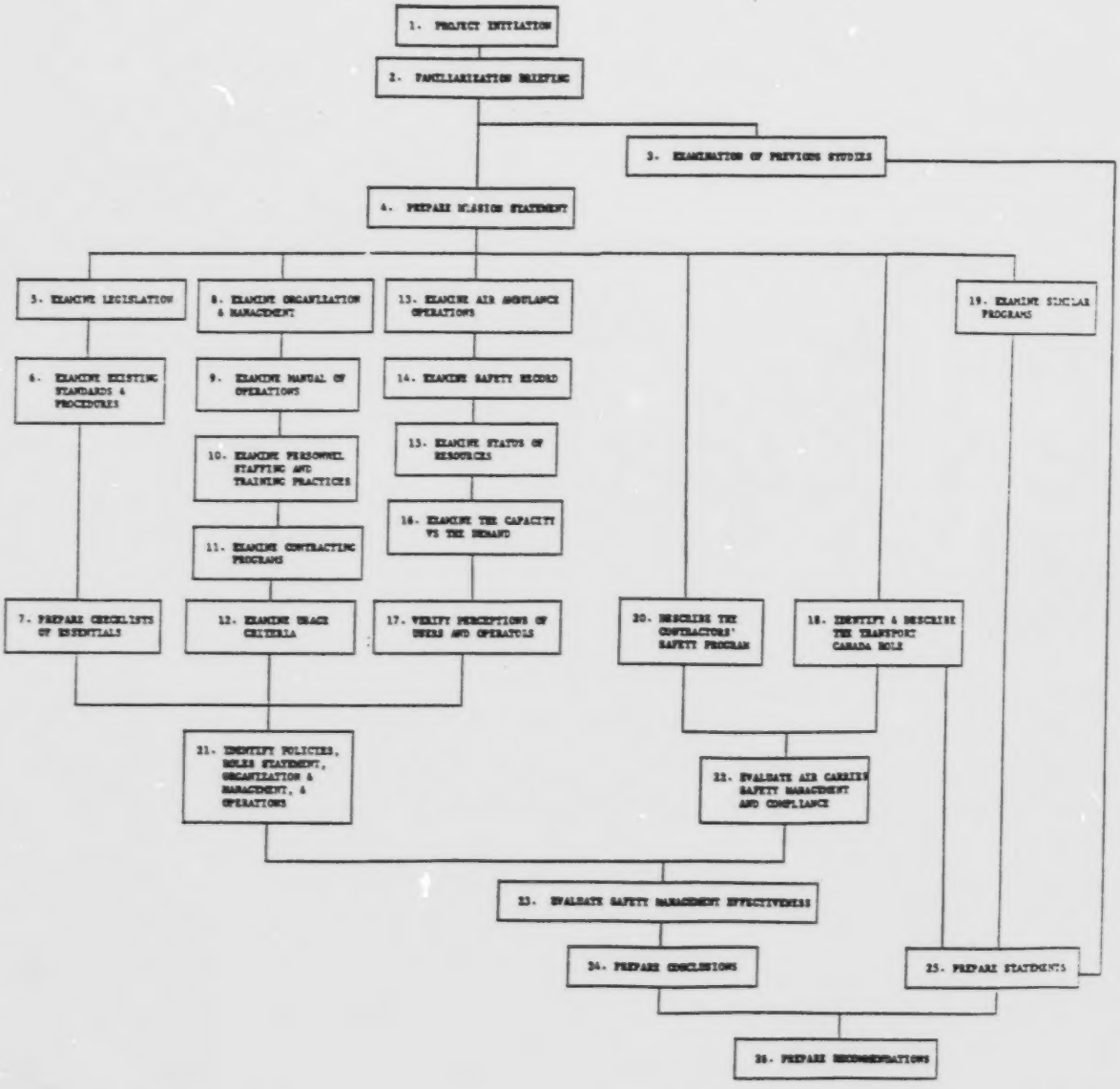
2. METHODOLOGY

The complexity of the subject matter under review led to the tasking logic chart illustrated in Figure 2 which identifies 26 tasks and their inter-relationship.


1. PROJECT INITIATION
2. FAMILIARIZATION BRIEFING
3. EXAMINATION OF PREVIOUS STUDIES
4. PREPARE MISSION STATEMENT
5. EXAMINE LEGISLATION
6. EXAMINE EXISTING STANDARDS & PROCEDURES
7. PREPARE CHECKLISTS OF ESSENTIALS
8. EXAMINE ORGANIZATION & MANAGEMENT
9. EXAMINE MANUAL OF OPERATIONS
10. EXAMINE PERSONNEL STAFFING AND TRAINING PRACTICES
11. EXAMINE CONTRACTING PROGRAMS
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15. EXAMINE STATUS OF RESOURCES
16. EXAMINE THE CAPACITY VS THE DEMAND
17. VERIFY PERCEPTIONS OF USERS AND OPERATORS
19. EXAMINE SIMILAR PROGRAMS
20. DESCRIBE THE CONTRACTORS' SAFETY PROGRAM
18. IDENTIFY & DESCRIBE THE TRANSPORT CANADA ROLE
21. IDENTIFY POLICIES, ROLES STATEMENT, ORGANIZATION & MANAGEMENT, & OPERATIONS
22. EVALUATE AIR CARRIER SAFETY MANAGEMENT AND COMPLIANCE
23. EVALUATE SAFETY MANAGEMENT EFFECTIVENESS
24. PREPARE CONCLUSIONS
25. PREPARE STATEMENTS
26. PREPARE RECOMMENDATIONS

Figure 2. Review Tasking Methodology

The time constraint of six weeks made it essential that selected tasks be undertaken in parallel but certain base-line tasks were essential and took precedence as Figure 2 illustrates. It was not possible to visit and interview all Air Carriers, so interviews were a mixture of visits and telephone calls using a checklist for consistency. The checklist is provided at Appendix A. Focus Group Interviews were arranged with Air Ambulance Attendants (paramedics) and the Dedicated District Managers. Also, each staff member in the Air Ambulance Service was interviewed two or more times. The Medical Directors of the Base Hospitals were interviewed by telephone. The detailed methodology for the collection and analysis of perceptions of the interviewees is provided in paragraph 4.9.

Documents studied included the Ambulance Act, RFP's, Air Carrier proposals to RFP's, Air Carrier Contracts and MOU's, draft Policy and Procedures Manual, draft EHS Air Ambulance Usage Information Guide, EHS Air Ambulance Information and Utilization Guide, Organization Charts, Position Descriptions, and many other documents as listed in the Bibliography.

Visits were made to the Manitoba Air Division which provides Air Ambulance Service, British Columbia Air Ambulance Service, and two USA Emergency Helicopter Services to provide data for comparison with the EHS Air Ambulance Service. Other provincial Air Ambulance services were interviewed by phone to obtain data on their services.

The Canadian Aviation Safety Board and TC provided accident data on Ontario Air Carriers as well as the national Air Carrier data. These data were then studied for their relevance to the review and selected data retained for comparative purposes.

The TC Directorate of Aviation Safety Programs (DSP) Branch met with the review team several times and accompanied team members on the outside Ontario visits. The DSP contact provided an excellent source of data promptly which would otherwise have been difficult to access in time for the review.

Tasks 21 and 22 provided data on the Air Ambulance Service Policies, Operations, and Management, and the Air Carriers' safety management and the record from which the overall safety management effectiveness was assessed and conclusions reached.

Task 25 consisted of summarizing the relevant data and information from previous studies, similar Air Ambulance programs, and Transport Canada. These summaries were then compared with the conclusions from Tasks 23 and 24, and where appropriate, recommendations were drafted.

Other recommendations were arrived at purely on the basis of expert judgement of the evaluation of the data obtained in each task.

3. ASSUMPTIONS

The Terms of Reference (TOR) state that the comparison with other Air Ambulance programs should include the seven points of the TOR. However the MOH Air Ambulance Service is unique because it utilizes approximately 40 Air carriers within and external to Ontario including US carriers, and dispatches province wide and internationally by means of the CAACC. Thus an assumption was made that only the TOR items which were applicable would be used in the comparison.

A second assumption was made concerning the press reports that the MOH should not be using contracted charter services for Air Ambulance duty. It is assumed that the Review is not expected to study this hypothetical question because it was not addressed directly in the TOR, but is prepared to comment if the findings so warrant.

4. FINDINGS

4.1 Introduction

The findings are provided under the following headings:

- Legislation, Policies, and Standards
- Role
- Organization and Management
- Air Ambulance Operations
- Safety Record
- Status of Resources
- Capacity vs Demand
- Perceptions of Users and Operators

4.2 Legislation, Policies, and Standards

4.2.1 International and National Aviation Standards

The International Civil Aviation Organization (ICAO) which was created by the Chicago Convention 1944 has 17 Annexes which deal with international (ICAO) standards and recommended practices (SARPS). Each member state of which there are approximately 145 agrees to abide by the ICAO SARPS and either literally uses the ICAO SARPS as its minimum standards or it promulgates its national standards which are more comprehensive than those of ICAO.

The consequence of this development is the fact that Air transportation safety has an international baseline. The notion is that each passenger deserves a similar level of safety throughout the world. Member states file differences when their national standards depart from ICAO SARPS so that other states have an opportunity to reflect the impact of a difference in the bilateral agreements arrived at between states for flights into each other's territory.

Canada's standards are of the highest quality, similar to those of the US and the other aircraft manufacturing states. Thus the standards applied to Air Carriers operating in Ontario are those of the highest quality, so basically the MOH Air Ambulance Operators would be expected to provide safe operations under the regulation and safety programs of Transport Canada.

However, the TC regulation and control of Air Carriers is predicated on standard Air transport operations of either the Scheduled or Charter movements of people and goods. Special purpose operations often require additional regulations, standards, and guidelines, but TC does not necessarily issue new regulations or

standards for the Carriers because it can place restrictions in the operating specifications of the Operating Certificate. Also, it is often the practice of TC and the special purpose operator to agree upon the operating specifications after appropriate consultations, or for TC to issue supplementary manuals which include special guidance criteria which are applicable on a national basis.

The Air Ambulance operation which should be considered as a special purpose operation can be accommodated almost totally within the current Air Regulations, the exceptions being standards for Air Ambulance cabin attendants and certain types of life support equipment to which patients are connected, and the stretcher and its support system. Thus either the regulations under Aeronautics Act or the Ontario Ambulance Act could become the enabling legislation. Irrespective, the obligation rests with the Air Ambulance Service under the Air Ambulance Act and Health Disciplines Act to ensure that there is no ambiguity in its application of safety criteria in the area where no minimum national standard exists.

In addition to minimum standards it is normal for the special purpose operator to set higher standards for its own operations for reasons of company policy. In the case of the Air Ambulance Service, the RFP for Dedicated aircraft is the means by which the higher standard is mandated. In the case of standing offers for Charter aircraft the same is possible.

It is normal to employ operational requirements methodology in arriving at the standards of the special purpose operation. These should state the operating criteria including management philosophy, pilot experience, weather conditions limitations, navigation aids criteria, level of safety expected which dictates aircraft design requirements, maintenance, number of engines, airport characteristics, and communications. Also, the life support equipment requirements would be included as well as special seating arrangements and door access requirements. Thus, the RFP and Standing Offer could reflect the operational requirements and equipment specifications; the requirement for cabin attendants could be included in the operational requirements.

However, the preferred approach would have a regulation under the Ambulance Act stating that Air Ambulance operations are required to meet standards published by the Minister. Normally the standards should be subjected to consultation with the users as is the practice by aeronautical authorities. An RFP and Standing Offer would then reflect the relevant regulations and standards and leave no doubt in the applicant's mind as to what is expected.

Thus the concept will be seen as not infringing upon TC's role but as an extension of the international/national approach to standards for aircraft operations and to which Air Carriers are accustomed and to which the MOH could confidently expect respect of the operating community.

The Ambulance Act, policies, standards, and practices were examined on the basis of the foregoing internationally accepted Air transport philosophy.

4.2.2 Enabling Air Ambulance Legislation and Standards

The Ambulance Act, Revised Statutes of Ontario, 1980 Chapter 20 provides for an "ambulance service" using an "ambulance", both of which are defined in S.1. The Act further provides for licensing an "ambulance service" by the Director as per S.4, appoint inspectors as per S.18 and subject to the approval of the Lieutenant Governor in Council, provides for the Minister to make regulations as per S.22.

The regulations that may be included within the limits of S.22, include such items as the following:

a. prescribe standards of conveyances and equipment for Ambulance services and of their maintenance, repair and requiring the approval of the Director for the acquisition of such conveyances and equipment as are specified in the regulation.

b. governing the management, operation and use of the services

c. prescribing the records, books, audit and accounting system

d. prescribing the qualifications for persons employed in Ambulance services including their testing and examination etc.

If the Ontario Air Ambulance Services (AAS) was created under the Act, then regulations as per S.22 would be expected to have been promulgated defining the main parameters of the service, in a similar manner in which Regulation 14 was issued specifically relating to a motor vehicle licensed under the Highway Traffic Act. A set of specific regulations governing the operation of the AAS do not exist but the existing service has attempted to copy many of the same premises on which the ground Ambulance service was developed.

There has recently been a set of standards and requirements for commercial aircraft developed between MOH and MNR. If finally approved they would be called a "Directive" published in accordance with the Ontario Government Management Board of Cabinet Directives. This Document does not refer to the requirements for the minimum aircraft standards such as FAR 23 amendment 32 or FAR 27 Cat A or B. The Document also contains certain aircraft requirements which are difficult to comply with and would eliminate most helicopters operating in Canada at the present. Example - it calls for all aircraft to be certified IFR when few helicopters are so approved.

Also, no TC standards exist, to specifically cover the installation of stretchers or child ambulators, nor are there any standards that govern the design of such devices so that they are considered safe for the transportation of patients in aircraft. Although the AAS assume that this is a TC responsibility, in fact TC do not have standards for these equipments, or for the means required to strap patients in ambulators during periods of air turbulence. TC Staff Instruction #32 which has been quoted in E.H.S. AIR AMBULANCE INFORMATION AND UTILIZATION GUIDE, is a set of guide lines provided to TC personnel when approving a stretcher installation in an aircraft. It specifically states on page six that there are no specifications for stretchers used or intended to be used on civil aircraft and does not speak at all to the problem of restraining a patient in an ambulator. This same document, on page seven, states that "the patient must be accompanied by a qualified attendant who should be assigned the seat which is most convenient to attend the patient", a statement which is not supported by any regulatory document issued by TC.

In addition to the above, additional considerations that can be related in part, to a set of standards for AAS, are contained in the Standing Offer for "Chartered aircraft" and in the proposal requests for "Dedicated aircraft".

However, none of the above either by themselves or collectively, provide for a comprehensive set of standards which cover the design and maintenance of aircraft and medical equipment, aircraft operational systems including the standards for cabin attendants and usage criteria.

Specifications for the charter operation require a high level of readiness for Air Ambulance operations and this in itself may cause safety problems. For example, the mobile equipment used to convert the aircraft from a passenger service to an Air Ambulance may not be tied down appropriately or the means of carrying the patient may not be approved by TC Airworthiness. Furthermore, mobile equipment and tie-downs used may get worn and damaged due to frequent handling. There are no additional aircraft maintenance and medical equipment inspection schedules to ensure this equipment remains in good working order.

Specifications for the Dedicated Carriers and Charter Carriers do not include interior crashworthiness. There is no requirement for ensuring all interior surfaces are kept free of protruding items, in other words, the aircraft interior should not become a safety hazard in case of a crash or flight into turbulence.

There are no specifications set for the type of escorts required on Charter aircraft Air Ambulance flight. Escorts become the responsibility of referring physicians.

The MOH Ambulance Act and the Health Discipline Act establish the criteria for patient level of care during transportation to or from medical facilities. No delegation of authority could be found for delegation of this responsibility where no escort equivalent to an Air Ambulance attendant is provided.

The Ministry of Health has not established dispatch criteria for the level of medical care required on Air Ambulance flights. Therefore, the only criteria followed for dispatch is based on logistics.

Dedicated contract operators have to abide by a different set of specifications than their charter operator counterparts.

Some of the contract specifications for the Dedicated aircraft operator are higher than those of chartered aircraft operators.

4.2.3 Summary of Findings Concerning Enabling Legislation

The Ambulance Act provides for the Minister to make regulations for an Air Ambulance Service. No specific regulations exist that reflect the Air Ambulance program.

4.3 Role

Research into the Ambulance Act, draft Policy and Procedures Manual, draft EHS Air Ambulance Usage Criteria, EHS Air Ambulance Information and Utilization Guide failed to disclose a definitive role statement for the Air Ambulance Service.

The Introduction to the EHS Air Ambulance Information and Utilization Guide describes the Service as follows:

> "The Air Ambulance Service is an integral part of the long established land Ambulance system, and normally transfers stabilized patients from one medical facility to another that has a higher medical care. In addition, where a land Ambulance either cannot reach a critically ill patient at an isolated site, or is unable to do so in the time demanded an Air Ambulance will provide the means. This service is available daily on a 24 hour basis."

The Minister's Briefing Book contains an item entitled Emergency Health Services Branch dated July 31, 1989 which contains a role statement for EHS as follows:

> "To provide timely response and care to those with immediate or urgent medical need, from the recognition of the emergency to the time when emergency care has been completed; and, to transport non-emergency patients to and from medical facilities."

Air Ambulance and Ground Ambulance should have separate role statements because of the costs of Air transport, the need for higher standards in Air operations, the limiting factors in providing the desired level of care aboard aircraft, the promptness of normal Air operations, and the complexity of dispatching Air Ambulances.

Therefore it is desirable that the Air Ambulance role statement reflect its unique characteristics so that there is the minimum possible likelihood of incorrect perceptions by the users, suppliers and the general public.

Accordingly the role statement for the Air Ambulance should speak to the level of care enroute as dictated by the Health Disciplines Act, Aeronautics Act, and the criticality of the patient's condition. Also, the constraints against misuse of Air transport should be captured to discourage the Air-taxing of patients who could travel by surface or scheduled Air transport.

The relationship of a clear role statement to the Air Ambulance regulations, policies, and standards is essential to the well being of an effective service.

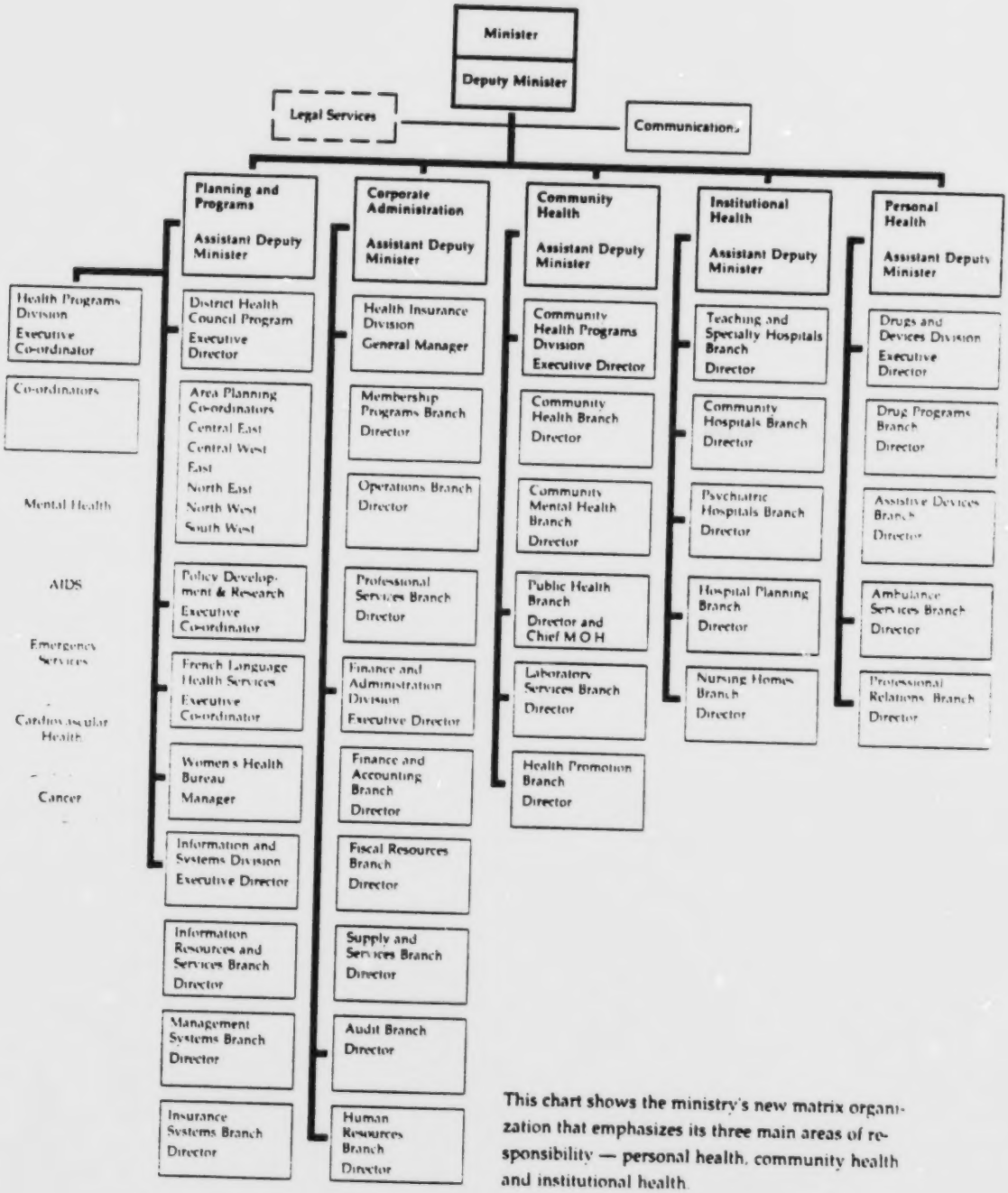
4.4 Organization and Management

4.4.1 MOH Organization

The Emergency Health Services Branch is located within the Personal Health Group of the Ministry of Health. The organization chart in Figure 3 illustrates that the medical facilities are within the Institutional Health Group. Thus it appears that the Ambulance Act and the Health Disciplines Act are administered by different groups under different Assistant Deputy Ministers. It should also be noted that in Figure 3 the Emergency Health Services Branch is identified as the Ambulance Services Branch.

Figure 4 represents the organization chart for the Emergency Health Services Branch and was obtained as part of the Minister's Briefing Notes dated July 31, 1989. However, Figure 3 is dated July 1988, therefore it is assumed that the name of the Branch was changed between July 1980 and July 1989.

The Air Ambulance Service Manager reports to the Director EHS, and he has three supervisors reporting to him although Figure 4 shows only three and does not include the "Contracts Auditor". The Service draws support for finance, personnel, contract administration, legal, plans and programs from other EHS Managers and other MOH Groups. The Review Team was not able to assess the timeliness or effectiveness of these support services, but gained an impression that this area is not really geared to the needs of Air Ambulance Service which is a complex Air transportation system. In point of fact the EHS Organization in Figure 4 indicates that most of the organization is devoted to the Ground Ambulance Services.

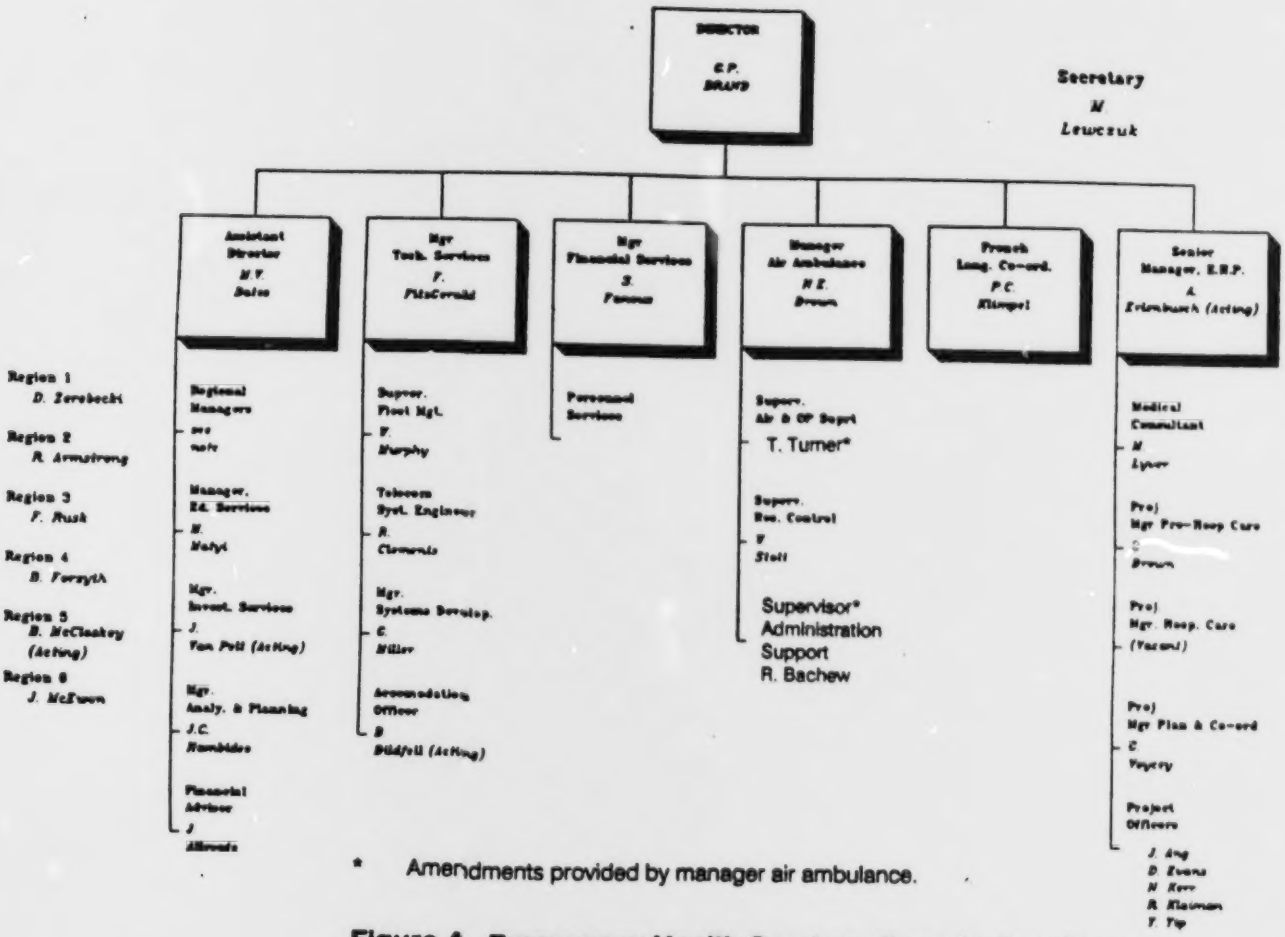


This chart shows the ministry's new matrix organization that emphasizes its three main areas of responsibility — personal health, community health and institutional health.

Figure 3. Ministry Organization Chart

DIRECTOR

EMERGENCY HEALTH SERVICES BRANCH



* Amendments provided by manager air ambulance.

Figure 4. Emergency Health Services Organization Chart

Each supervisor has a specific responsibility as follows:

Supervisor Resource Control, Position Code 05-3331-21

"To ensure appropriate use, management and control of the personnel, financial, and material resources allocated to Chartered aircraft, Air escorts roster and dispatch service components of the provincial Air Ambulance service."

Supervisor Air & Operations, Position Code 05-3331-03

"To direct the field operations of the Dedicated Air Ambulance service and to ensure the appropriate utilization of personnel, aircraft, landing facilities, base stations, equipment and funds in the provision of an efficient Air Ambulance service to the residents of Ontario."

Supervisor Administrative Support, Position Code 05-3331-10

"To provide administrative and clerical support for the Air Ambulance Unit and to supervise and coordinate the processing of Air Ambulance claims."

4.4.2 Field Organization

The supervisor Operations has District Managers at each of the 5 Dedicated Aircraft Bases located at Thunder Bay, Timmins, Sudbury, Sioux Lookout, and Toronto-Buttonville reporting to him. The Bases work with the Base Hospitals with which the EHS has a contract to provide training and medical direction for patient care for Dedicated Air Ambulance Attendants. The aircraft are operated on 5 year contracts awarded on the basis of competitive RFP's. The locations of the aircraft are as follows:

Timmins	Fixed wing Cessna Citation with Cessna Citation backup
Sioux Lookout	Fixed wing King Air 200 with King Air 100 backup
Thunder Bay	Rotary wing S76 with S76 backup
Sudbury	Rotary wing Bell 212 with Bell 212 or Bell 206 backup shared with Buttonville
Buttonville	Rotary wing S76 with Bell 212 or Bell 206 backup shared with Sudbury

Each base consists of a Manager and a number of Air Ambulance Attendants who are variously known as Paramedics and EMCA (see DEFINITION page ii). The impreciseness will be discussed further in this report.

4.4.3 Dispatch

The heart of the Air Ambulance Service is the CAACC which dispatches aircraft from its Toronto location throughout Ontario and to out-of-Ontario destinations on a 24 hours per day basis. The CAACC Manager reports to the Supervisor Resource Control. The CAACC is responsible for matching the type of aircraft, and the level of care required with the appropriate Priority Code as follows:

Code 1 Non-Urgent, delay tolerable

Code 2 Scheduled, a specific time to provide treatment or diagnostic facilities

Code 3 Prompt Transfer, patient stabilized or under professional care and may be seriously ill or injured.

Code 4 Urgent, life threatening, time critical

4.4.4 Review Team Observations

The organization appears to work well in spite of the constant demand upon the Manager Air Ambulance Service, his Supervisors, and District Managers. They are all taxed beyond their position descriptions, but their personal dedication to their responsibilities is commendable, and approaches being indispensable.

The Review Team had not been afforded sufficient calendar time to examine the organization in depth but several observations support the impression that the Air Ambulance Service Organization has too few personnel and lacks specialist skills to support the managers. These observations include:

i) key documents containing policy, procedures, standards, guidelines, organization charts, position descriptions, instructions lack dates, or source of origin, or both. In point of fact some have been in draft form for as long as 5 years because the staff has not found time to finalize them. In the meantime sections have been released as policy letters, but it was a challenge to the Review Team to assemble the policies, standards, procedures, etc. which are applicable during the Review.

ii) Personal Assessments of the District Managers have not been undertaken since inception of the positions.

iii) There is no Operations Manual to provide the procedures for: safety management; aircraft and heliport inspections; resourcing; training; planning; analyses of incidents; monitoring of usage criteria; communication procedures with Transport Canada, Ministry of Natural Resources, Base Hospital Medical Directors, Air Carriers; and Position Responsibilities of Air Ambulance Service.

iv) There is no inspection schedule for either the Dedicated or Charter Air Carriers.

v) There is a high turnover of dispatchers in the CAACC, ten in 1988 and 5 to date in 1989.

vi) The District Managers have only part time support staff and they are obliged to misuse their time and talents on administrative duties, linen pickup, garbage disposal. It is likely that they should also be provided a managerial excluded deputy manager on a full time basis.

In addition to the foregoing, several other observations were made which reflect upon the organization and management deficiencies in trying to support in excess of 40 patient transfers per day. These are listed as follows:

There is no requirement in Air Carrier contracts for the Air Carrier to have an Aviation safety program or to report on a regular basis to the Air Ambulance Service on its safety record.

The District Managers report that they have no time to conduct Air Carrier inspections. Unique District requirements are not reflected in the resource allocations. These relate to the distant location of some bases and their isolation in a supply sense.

Air Ambulance attendants are often obliged to fly alone as a single crew member instead of in pairs as decided by EHS on May 30, 1989 subsequent to concerns expressed by the Ontario Public Service Employees Union. Fourteen new Air Ambulance Attendants are being recruited, but the Review Team did not locate an analysis of the demand and tasking of Air Ambulance Attendants based upon the current and forecast growth of the Service. The report will examine the Air Ambulance Attendant staffing in detail. There is no management system to study trends in supply and demand of staff and resources.

The high turnover of dispatchers suggests an occupational study of the position is needed.

Inconsistent application of usage criteria described by Air Carriers, Air Ambulance Attendants and pilots.

Air Ambulance Attendants are selected to the same criteria as Ground Ambulance Attendants which does not include flight safety and ALS requirements but, does include TC medical.

Crew Certification is not required for Air Ambulance Attendants.

Part-time Air Ambulance Attendants are not adequately qualified and some Bases have a high proportion of them. (see para 4.7)

Air Carriers provide training to Air Ambulance Attendants according to their own standards, because Cabin Attendant training standards and criteria do not exist.

The contracting policy and standards for both Dedicated and Charter aircraft were examined in depth. The comments made in the Legislation paragraph 4.2 of the report indicated that because of the lack of regulations and related standards that the contracting policy and procedures are not controlled by statute as is aeronautical practice, and the operators are subjected to administrative actions which could be impartial, unfair, without appeal procedures, and open to possible misuse.

No further comments will be made until the evaluation of current contracting practices is discussed in the Air Ambulance Operations paragraph 4.5 of this report.

The Usage Criteria has been referred to in reference to the CAACC dispatch operations but has not been discussed in relation to policies and standards. The Priority Codes appear to be unambiguous and could be considered the basis for practical Usage Criteria. However, several observations were made in relation to misuse or ineffective application of the Codes. These are discussed as follows:

- Bases complain that a significant number of patient transfers occur under Code 1 and Code 2 with Dedicated aircraft when Charter aircraft would be more realistic. As a consequence when a Code 3 or 4 arises which requires Dedicated aircraft, none is available.

- District Managers and Air Ambulance Attendants state that Base Hospitals treat Air Ambulance transportation as an air taxi and could often select Ground Ambulance. This has been corroborated by some pilots and Air Carriers.

- Allegations were made that Base Hospital medical staff have arranged Code 1 and 2 transfers to suit a travel requirement of medical staff to another medical facility.

- Cases have been recalled of attempts to dispatch an unsuitable type of aircraft. In fact medical staff normally request pressurized aircraft whether or not pressurization is required for patient level of care.

- Air Carriers on charter calls have had numerous experiences where no escort was provided and the patient was unfit to fly unattended. On other occasions unqualified escorts were provided.

4.4.5 Summary

The majority of the observations related to organization and Management have emphasized the need for increased personnel resources to undertake the completion of the policies, procedures, standards, and manuals which would provide the current staff with the means to manage the Air Ambulance Service more effectively and efficiently. The success enjoyed to date in managing a doubling of demand over a period of eight years with only a marginal increase in staff is remarkable and a tribute to the staff.

The future growth is a significant factor. The staff is of the opinion that the growth will be limited to another ten percent in a year or two. On the other hand the Ontario Treasury announced on August 10th, 1989 that the population will expand to 11.9 million by 2011 which is 30 percent higher than the 1986 census. To this must be added the demographic influence which indicates an increasingly higher percentage of senior citizens in the population. It is hard to believe that slowdown in demand for Air Ambulance will be as flat as the staff forecasts.

No strategic planning was found in the Air Ambulance Service Organization and management of the Air Ambulance Service. Current plans to introduce a computerized management information system should be a great asset to the staff. If the software program provides the means to collect data on usage criteria, Air Carrier performance, staff duty hours, incident occurrences, costs of all the variables so that trends may be analyzed and corrective measures taken, then the prospects for improved management and lower operating costs are promising. The Review Team was not in a position to examine the software program and therefore cannot comment further.

4.5 Air Ambulance Operations

4.5.1 General

There are two types of Air Carriers used by AAS to carry patients, these are called Chartered and Dedicated.

As stated in the E.H.S. AIR AMBULANCE, INFORMATION AND UTILIZATION GUIDE, issued by the MOH in January 1987:

> "five aircraft bases constitute what is referred to as the Ministry's Dedicated Air Ambulance Service, so called because the aircraft at the bases have been allocated for exclusive operation as Air ambulances, and have interiors that are modified and fitted to accommodate patients, health-care staff, and specific advanced like - support equipment."

"chartered aircraft supplement the Dedicated aircraft, for non-emergency transfers, and at times when Dedicated aircraft are either out on some mission or being used for specialized requirements. All these aircraft have had to satisfy pre-qualifications conditions in such areas as regular inspections, minimum standards of operation and the provision of basic medical and survival equipment. At any time the final selection of any one aircraft will be determined by its suitability, availability and cost. Where more that one supplier meets these criteria on an equal footing, assignments will be made on a rotational basis."

Both types of Air Carrier aircraft could be considered as an "ambulance" under the Ambulance Act.

The administrative differences of the Dedicated versus the Charter operators are mainly that: the Dedicated is paid for standby duties regardless whether the aircraft flies or not, a trip flown is a break even operation; the Charter is paid per trips flown only; the Dedicated aircraft colour scheme has to reflect its Air Ambulance role; and, the Charter aircraft has no required identification.

4.5.2 Selection

The selection of Air Carriers under the definition of Chartered aircraft is carried out via a system using a "Request For Standing Offer", issued by the MOH annually and at such times as they deem it necessary to adjust their listing of available Air Ambulance aircraft. The Offer outlines all the factors which will be taken into consideration when the MOH review the Carrier proposal for making available his aircraft as an Air Ambulance. The Offer includes many factors, some of which appear as standards and others as desirable factors. Examples are as follows;

a) Pressurized aircraft will be given preferential consideration

b) The requirement to submit proof of DOT approval as a Air Carrier, CTC license, Certificate of Airworthiness for each aircraft proposed, pilot licenses, endorsements and safety record as well as medical certificates concerning immunization, flight engineer licenses and endorsement and radio licenses.

c) A drawing showing proposed storage and fastening of medical equipment and stretchers .

d) The Carrier must have a capability of working with the MOH flight following system of the CAACC.

e) If the Carrier intends to provide medical attendant service available, he will be given a preferred rating. The Carrier will have to describe the qualifications of his attendants. (Air Ambulance "medical attendants" have no definition in MOH regulations; only ground "medical attendants" is defined).

f) The Offer has 9 Appendices, which state specifically what the Carrier should respond to when making a proposal. Although they at times appear to be absolute requirements, the preamble in the Offer makes it clear that this data if for choosing the best Carrier and are not absolute factors.

Appendices of the Standing Offer:

Appendix A - Requirements Of Service - specifies aircrew requirements, facility requirements, types of aircraft, capacity of aircraft, interior of aircraft requirements, patient compartment, communication and navigational aids, medical equipment, patient compartment lighting, external colours and markings, safety items

Appendix B - Aircraft and Operation Information - requests information on aircraft performance including balance field lengths, weights, engines, aircraft dimensions, fuel, noise levels, aircraft availability and maintenance and stretcher accommodation capability among others

Appendix C - Patient Equipment and Supplies - states what stretcher equipment required, resuscitation kit requirements, and on board medical supplies required

Appendix D - Minimum Survival Supplies Required To Be Carried - specifies survival equipment for 5 persons for 5 days in Northern Ontario

Appendix E - Flight Following Communications - specifies procedures required

Appendix F - Aircraft and Base Station Particulars - requests particular of aircraft, location of base stations and facilities at each

Appendices G, H and I - speak to administrative matters

Following the submission of the Carriers' proposal to the Offer, AAS compares the proposal to the factors included in the Offer and if all factors have been answered to the AAS satisfaction the Carrier is granted a Standing Offer. There is no comparison of one Carrier to another since any Carrier who wishes to apply and meets those criteria listed in the Offer can be successful.

The selection of Carriers to provide Dedicated Aircraft is conducted on a more formal basis than that for the Charter Aircraft because it is on a competitive bidding basis that the decision is taken as to who will supply the service. The process used was reviewed by the Ombudsman of Ontario following a complaint by one of the bidders and his report has stated:

"My Office's investigation indicated that each of the proposals was evaluated according to predetermined criteria. In my opinion those criteria were appropriate. Although the evaluation of how each proposal met those criteria was of necessity exercised subjectively, I cannot conclude that the evaluation was conducted unreasonably or unfairly."

The types of fixed-wing aircraft requested for both types of services are similar in that the Standing Offer for the Chartered carriers speaks to twin-engine fixed wing aircraft, whereas the RFP for the Dedicated Carriers speaks to twin-jet and/or turbo propellor pressurized aircraft. In both cases there is a requirement for a balanced field length of 3500 feet or less and for the aircraft to be equipped to fly into known icing.

However, the small turbo-prop aircraft with fewer than 10 passenger seats are not required to demonstrate balanced field lengths for type certification. Therefore, operators of such aircraft have difficulty proving they meet this specification. Also, just because an aircraft is equipped to fly into known icing, does not mean that it is approved to do so; it must be demonstrated to the airworthiness authorities that the aircraft is safe for this type of operation. For instance, the PA 31 series of aircraft do not have an approved balance field length, since the aircraft manufacturer has not elected to determine one and is not required to do so.

4.5.3 Specifications and Inspections/Audits

The Dedicated service operators must meet a series of specifications over and above the TC requirements. These specifications are more stringent than those of the Charter service, for example, the company and its pilots must show a higher level of experience in Air operations (it is interesting to note there is no requirement to show a management structure which includes a safety management system or to show there are any safety program activities).

There is a mechanism in place called the Annual Review which is an inspection by a Company representative, the District Manager, an Air Ambulance manager, and a member of Supply and Services. This Annual Review is a contract requirement set up to ensure that the terms of the contract are being met, however it does not cover the full range of aviation operational aspects. Nevertheless, from an aircraft operational safety point of view, the Ministry of Health Air Ambulance Section relies on TC inspections.

This reliance on TC inspections may be misleading as these are designed to verify their own requirements which may not necessarily be the same or at the level of performance demanded by an Air Ambulance Program.

Furthermore, although TC inspections are supposed to be scheduled once a year, their frequency is dependent on the level of resources of the TC Licensing and Certification Branch. In this period of Economic Regulatory Reform where new Air Carriers are sprouting all over the country, excessive demands are being made on these same resources, not to mention the attrition of inspectors who are attracted to higher paying jobs in the industry. Therefore, there is no guaranty these inspections are being carried out.

That is not to suggest the level of safety imposed on Carriers by TC are not being met, it is merely to state they are not being verified. The same argument could be used for the requirements of the Air Ambulance Program. However, as manager of the Air Ambulance Program, the Ontario Ministry of Health has the responsibility for the level of safety of its contracted services and therefore would be expected to ensure that all specifications are being met. This includes of course the TC minimum requirements. The only way this can be done is through inspections/audits.

Inspections or audits are terms which could mean different things, and therefore one could probably say some are presently being done. The expected level of safety should be reflected in the specifications. This raises the subject of the specifications now being used in the RFP process.

The preparing of specifications for specialty operations such as an Air Ambulance program is as much a science as the preparing of an inspection checklist. Indeed both should be prepared simultaneously. In any case the primary and most important task before any of these procedures are carried out is to clearly establish and state the operational requirements of the Air Ambulance Program. Then aviation expertise can be used to prepare both a list of specifications and an inspections checklist along with the medical requirement which should be handled in the same fashion by medical personnel.

Inspection System

The inspection system which has been recently introduced under the document titled "Aircraft Inspections", in a section of the MOH Manual of Policy and Procedures (Draft), and is intended:

"to ensure periodic checks on important aspects of the operation are carried out in the interests of safety and adherence to the standards agreed upon". The document goes on further to state that the inspection is to "ensure the quality of service offered in the following categories meets the standards agreed on: aircraft maintenance program, aircrew training program, communications system, record of service and safety program, aircraft equipment, Ambulance medical equipment and base facilities"

The document goes on to say that "The quality of service provided by the aircraft companies will be monitored regularly by various organizations working under an inspection program. Each organization works under specific guidelines which delve into various aspects of the aircraft companies' service with the aim of ensuring that the highest minimum standard is maintained as laid down in the agreed on contracts and the Ambulance Act, in concert with Transport Canada regulations, agreed companies' polices and the Ambulance Policy and Procedures Manual" It then goes on to explain the role of the various agencies along with the Air Ambulance District Managers and the Air Ambulance Manager.

The document also states that "The Transport Canada inspections follow that organization's regulations covering factors involving the Air Ambulance service which are brought to the Ministry's attention for action on an as noted , as required basis" . The document also states " Transport Canada inspectors conducting their normal duties provide an input to the aircraft and helicopter inspections and Ministry inspections will be made by the Charter Audit, Inspection and Investigation Service, the Air Ambulance District Managers and the Manager of the Air Ambulance system."

Notwithstanding the above, it is understood that there is no formal understanding with TC for it to include in its inspections under the Aeronautics Act any consideration of MOH responsibilities under the Ambulance Act/Regulation; and, as far as can be ascertained there is no formal agreement with MNR to carry out any portion of MOH responsibility under the Ambulance Act/Regulation. Since there are no regulations governing the Ontario Air Ambulance Service, hence enabling the standards and procedures, it is difficult to comprehend how the organization can expect to ask other government agencies to inspect a Chartered Carrier on their behalf without an MOU enabled by statute.

The document also states that annual visits will be made to each Charter/contract aircraft operator to inspect and report on the status of medical equipment, related health care topics and subjects of general interest. Also, Managers will visit each Air Carriers base annually and conduct an inspection designed to ensure standards are maintained at the highest reasonable levels in accordance with the referenced guidelines; and, finally the Manager of the Air Ambulance Unit will conduct annual visits to contract Air Carriers and to medical heliports to monitor the standards being upheld.

A system of inspections without published standards or operating procedures and without formal agreement with other government agencies does not satisfy the intent of the Draft Manual of Policy and Procedures.

Following the issuance of the Request for Standing Offer and the selection process to select the Carrier, an inspection process may take place. In some cases, an inspection prior to final operational approval is undertaken and sometimes an inspection is undertaken immediately following the operational clearance of the Carrier; no firm policy exists. In the case of those USA Carriers selected to supply Chartered Aircraft, it is understood that they were never inspected before the approval and at no time subsequent to the approval. Ontario Carriers have had a variety of inspection visits numbering two at most in the course of their selection as a Chartered Aircraft Carrier. District Managers, who have a responsibility to carry out inspections of both the Dedicated and Chartered Carriers do not have the resources at their disposal to carry out the inspection function for Chartered Carriers; their time is totally consumed in handling the Dedicated Aircraft service.

To further complicate the value of the inspection system, inspections are carried out by personnel of AAS who have little or no aviation experience; other than the AAS manager himself, personnel are basically Ground Ambulance trained. Therefore the results of any inspection using draft check sheets, in terms of providing management with a valid assessment of those Carriers is less than satisfactory.

4.5.4 Flight Operations:

4.5.4.1 Dedicated vs Charter

The operational differences between a Dedicated Air Ambulance operation and a Charter Air Ambulance operation appear to be:

- the Dedicated service is called first;
- the Dedicated service is the preferred mode of transport for codes 3 and 4;
- the Dedicated service operates with Dedicated medical attendants selected and employed by the Ministry of Health Air Ambulance Section; and
- the final decision on level of medical care rests with the physician, the Dedicated service provides a level of service which can be enhanced depending upon the need of the physician;
- attendants utilized by the Charter service are not selected nor regulated by the Ministry of Health Air Ambulance Section.

It seems the differences are based on preferences. The operational experience shows and statistical reports corroborate that the Charter service is being used for similar purposes as the Dedicated service (APPENDIX L). Since both the Dedicated and the Charter service provide the same service in practice, it is not understood why:

a) the specifications of the Charter service are not as stringent as those of the Dedicated service;

b) the medical attendants of the Charter service are not selected or at least controlled by the Ministry of Health Air Ambulance Section as those of the Dedicated service are; and
c) the Dedicated and the Charter services are at two different minimum required levels of flight and medical escort requirements.

In 1988, Charter operators carried 8847 patients vs 4539 patients by Dedicated operators. Dedicated operators carried 1580 codes 4, 1996 codes 3, 197 codes 2 and 766 codes 1. Charter operators carried 711 codes 4, 1,327 codes 3,705 codes 2 and 6,104 codes 1.

As the numbers indicate, Charter operators do carry more patients than the Dedicated operators. That stands to reason as there are only five Dedicated bases with five Dedicated and five back up aircraft. However, some 24% or 1911 of the Charter transfers are codes 3 and 4.

4.5.4.2 Communications

Both Voyageur Airways and Canadian Helicopters have demonstrated and admit to the importance of the crew concept in this type of operation. This is a difficult task to achieve since the Air Ambulance Attendant is considered a passenger under the Aeronautics Act; and, as such is not responsible or accountable for Aircrew duties. In any case, at MOH request, both Dedicated services have training programs in place to ensure some training of the Air Ambulance Attendant. Furthermore, they have instituted methods to enhance better coordination of their activities such as the integration of Air Attendants in safety meetings.

However, there appears to be uneasy feelings between Attendants who are Ministry of Health employees and aircrew who are company personnel. Air Ambulance Attendants who are basically Ground Ambulance attendants are introduced to a whole new type of operation. In the aviation community, the training and indoctrination one receives is quite extensive in recognition of the importance of mission effectiveness. However, in the case of Air Ambulance Attendants of the Ministry of Health, they seem to be treated as an add on rather than a full fledged crew member.

Whenever an accident occurs such as the one in Timmins, it is understandable to experience negative reactions. Insufficient aviation knowledge can lead to misconceptions. Although some efforts are being made by the Air Ambulance Service to alleviate this morale problem, the advent of success at present is not apparent.

The importance of proper co-ordination and communications in Air operations could not be overstated. Any morale problem on one or both sides leading to poor communications could be hazardous. Therefore, this integration is vital for aviation safety reasons as well as for operational success.

4.5.4.3 **Safety Management System**

TC Air Regulations requirements for air carriers set the minimum safety standards. The means of compliance is usually the basis for achieving a higher level of safety or a lower level of risks. One known and successful method of increasing a company's safety posture is through a Safety System Management program. This type of program provides the necessary risk management which gives control of safety situations to aviation managers. It is a warning system for safety deficiencies which allows managers to base their decisions on facts.

Such a program should have: the company management's commitment in the form of a clearly stated policy; a reporting system for close monitoring; an internal investigation and analysis system to clearly identify safety deficiencies; a communication system to handle the reporting system and to pass on valuable safety information back the appropriate audience; a carefully chosen safety officer or advisor to manage the safety program on behalf of the company president; the commitment of all personnel including administration and maintenance to ensure full participation; safety meetings to communicate and decide on safety plans and issues; internal regularly scheduled safety inspections to ensure everything is as it should be; a follow up program by a safety officer and/or advisor to ensure there are no loose ends; and, a human factors program to handle problems which are known to be an important in some 80% of accidents.

At present, Canadian Helicopters has a complete program which it acquired through the acquisition of Okanagan Helicopters. However, Voyageur Airways does not have such a comprehensive program, although it has appointed a company safety officer. Charter Carriers interviewed have not availed themselves of the voluntary TC Company Aviation Safety Management Program.

4.5.4.4 Geography

The province of Ontario is a vast territory with a population concentration in the southern section, and naturally, this is where specialized services are generally located. Operators of Air Ambulance aircraft, be they Dedicated or Charter operating in the southern section, face different conditions than operators of Air Ambulance in the northwestern section. For instance, distances are a lot further in the north resulting in much longer flights. Flights being longer means the aircraft and crew are no longer available for duties during long periods. This creates a requirement for back up which is greater than the back up requirement of a southern base. Furthermore, the northern bases do not have the same availability of Ground Ambulances. Again, distances being so great, aircraft become the primary emergency Ambulance; this is not to mention the areas where patients are only accessible by air.

Therefore, the whole concept of Air Ambulance operation in remote areas is different than the one in the south. If the same level of service must be maintained, different assumptions must be made. For example, the formulas used to determine the service level for the Buttonville operation do not apply to Sioux Lookout. Resource level allocation is a factor of level of performance expected.

There is enough data available on the number of flights required at each base; and, distances travelled and time away from base per call is almost a constant factor. Therefore, a calculation can be made to adjust the resource level of each base to ensure a continuous service at a predetermined standard of performance.

4.5.4.5 Dispatch

Centralized dispatch is a good system for ensuring maximum use of resources. However, locally known factors do not become part of the decision process when assigning aircraft and crews. There is already provision for local dispatch at Sudbury and Thunder Bay; so, some form of regional air dispatch is already in operation in two areas.

The present Dispatch system consists mainly of communications specialists and do not provide for air operations and medical care expertise. This expertise is required to effectively and appropriately match the air and medical resoruces to the needs.

4.5.4.6 Utilization

Although there is no doubt of the intent on the level of care for patients, it is evident that sometimes the level of care is allowed to deteriorate because of lack of suitable escorts.

4.5.4.7 Summary

It is the Air Ambulance Section's stated policy that Air Ambulance operations are only carried out by contracted Dedicated aircraft. The contracted Charters are supposed to be tasked on what is called simply patient " transport "; this appears to differentiate between the level of service and care offered to the patient. Therefore, there seems to be only one official Air Ambulance Program, and that is the Dedicated aircraft service. In practice however, the Chartered aircraft is an equal part of the Air Ambulance Program.

Whatever case may be made on the use of one service versus the other, the fact remains that the Government of Ontario's Ministry of Health is running a huge aircraft operation. The number of patient transfers in 1988 was 15,000, which suggests some 40 transfers per day. The number of flights compares to a medium size carrier operation. Yet, unlike its counterparts, the Air Ambulance operates with a minimum of statutory instruments related to its specialty operation. In addition, the staff relies upon the aviation experience of the Manager Air Ambulance Service to oversee the administrative based system. This in contradiction to the desired use of a regulatory based system administered by aviation specialists.

Although the Dedicated aircraft operators have recognized the need for safety programs, a significant number of Charter Aircraft operators do not have formal safety programs. The requirement for safety programs could be part of the contracting criteria until such time as a regulatory requirement is adopted.

4.6 Safety Record

4.6.1 Air Ambulance Operations

The TC published average accident rate for the period 1982-1987 in the Charter/contract category is 7.3 accidents per 100,000 hours.

The Ontario Air Ambulance Service average accident rate for the period 1982-1987 for both Dedicated and Charter is 5.9 accidents per 100,000 hours based on 85,000 patient transfers and assuming one hour per patient flight.

The Canadian Aviation Safety Board indicates that there were 21 accidents classified as Air Ambulance flights in Canada since 1980. Only six of those occurred in Ontario, and of these, two involved fatalities to crew and attendants. See Appendix Q for details. It is well known that the number of patient transfers in Ontario far exceeds the number of patient transfers carried out in all the other provinces put together. Therefore, it can be assumed that the same goes for flight hours. Although no exact comparison can be made, it is still possible to make a general comparison based on the limited data available, and the number of patient transfers. A generous estimate would have the total number of transfers by all the other provinces together (see data Appendices C to H) equal to the Ontario level (15,000 transfers in 1988). Assuming that this parity existed in the previous years back to 1980, the number of accidents for each of the two groups should have been equal. Yet, the number of accidents in Ontario is only approximately one third of the total Canadian Air Ambulance accidents.

4.6.2 Aircraft Charter

It is difficult to examine aircraft accident data for the province of Ontario because the accident location data is stored by regions whose boundaries are not exactly the same as those of the provinces. These regions have been delineated for TC administrative purposes and have been adopted by the Canadian Aviation Safety Board. In the case of the province of Ontario, the eastern boundary is the same as the geographic one; however, the western boundary is such that it positions a good portion of northwestern Ontario or approximately 20% of the province in the Central region. All accident data, statistics, reports, and comparisons are based on these administrative regions.

The TC Aviation Safety Programs year end safety briefing for 1988 states that the number of accidents in Ontario region to Canadian registered aircraft for 1988 was 10 accidents in the charter/contract category. The numbers were two for 1987 and three per year as an average for the years 1982 to 1986. There is no explanation given for this significant increase, however, the advent of Economic Regulatory Reform and the much improved economic conditions over the previous years, have given rise to much increased flying activities and competition. Therefore, even if the number of accidents has increased, the accident rate may very well have stayed the same or even be declining. Unfortunately, the accident rate cannot be calculated because the data on flying hours flown by operators is not available.

The same holds true for the whole Canadian picture. For instance, the total number of accidents to Canadian registered aircraft for 1988 was 99 in the charter/contract category. This compared to 75 in 1987 and 56 as an average for years 1982 to 1986. Here again and for the same reasons, the accident rate may very well have stayed the same or even be declining.

4.6.3 Voyageur Airways' Record

A review indicates that the company has had landing gear related accidents resulting from the type of airports served and the Chapleau accident since 1976.

The Canadian Aviation Safety Board has not yet completed its investigation into the Chapleau accident.

There is no structured safety program in Voyageur Airways but a company safety officer has been appointed. For an in-depth understanding of their company safety posture, a comprehensive safety survey would be required.

4.6.4 Canadian Helicopters' Record

Unfortunately, it is impossible to include similar information on Canadian Helicopters because the company has only been in existence a short while albeit a conglomeration of a multitude of former Canadian helicopter companies. For an in-depth understanding of their company safety posture, a comprehensive safety survey would be required.

However, this new company has the benefit of having acquired the organization and experience of the former large OKANAGAN organization. The safety system is well structured along the lines as those suggested by TC's Aviation Safety Programs Branch. The system is easy to understand and easy to use. Canadian Helicopters appear to make good use of it. They also have an appointed company aviation safety officer who is well qualified, known and respected in the aviation community.

As for comments on the Buttonville accident where the helicopter burned up on the ground after aircraft shutdown, the Canadian Aviation Safety Board is still investigating. However, a German helicopter of the same type has had a similar occurrence, and, there also, investigators were puzzled.

4.6.5 Southwest Air

At present, it is too early to comment on the accident at Pelee Island. The Canadian Aviation Safety Board will not complete its investigation for quite some time yet. The Review team did not interview Southwest Air management.

Aerodev

4.6.6 Protective Equipment

There is no requirement in either the RFP or the Standing Offer for aircrew or escorts to wear protective equipment. Some clothing items are required as part of the mandatory survival equipment which must be carried on board the aircraft. Helicopter operators who give support to oil rigs have acquired protective equipment for all personnel, aircrew and passengers. It has become standard practice to wear such protective equipment on all flights; this of course includes helmets. Indeed, Helicopter Association International (HAI) recommends the wearing of helmets for helicopter operations, including Air Ambulance operations. The Ministry of Health has offered to provide helmets to Air Ambulance Attendants.

4.6.7 Safety Concerns

Dedicated and Charter operators have safety concerns about airports and enroute aids which remain unresolved. These concerns are being dealt with by individual companies; this does not allow for cross reference to similar problems experienced by others. Handling by individual companies also precludes the recognition of the importance of a particular problem through repeated occurrence or experience by a number of operators. For instance, there is concern about operations into private or municipal airstrips which might not be appropriate for Air Ambulance operations; and, there is concern about navigation aids in northern Ontario which might affect the performance of operations. The Ministry of Health being the tasking authority has a vested interest in these safety concerns as they are those of its contracted operators. With over 40 of them under contract, and carrying out some 15,000 transfers (1988 data) the number of safety concerns and issues becomes significant. With the proper recording, investigation and analysis of these, many safety problems and even accidents may be prevented. Safety concerns handled by trained and experienced air operations personnel, and supported by a system or structure capable of supporting his initiatives can become the warning system of the whole operation. Preventive actions can then be applied early, before the concerns grow into problems causing accidents.

It is known that the Province of Ontario has been negotiating with TC to consider Loran C as an enroute navigation aid and non-precision landing aid in Northern Ontario, but the status of these negotiations is unknown. Also, the recommendations of the Coroner's Inquest Report into the Chapleau Air Ambulance Accident in 1988 speak to this subject.

4.6.8 Summary

The Ontario Air Ambulance safety record indicates that overall it is better than the national average.

It is difficult to assess the Dedicated operators' safety performance based on the limited data available. Certain factors also preclude this analysis. The high rate of change of personnel and Air Carrier acquisitions due to Economic Regulatory Reform have recently changed companies so much that it is impossible to use historical data to assess present company safety postures.

There are many safety issues and concerns which require attention. A Safety Management System handled by qualified personnel would provide the necessary risk management.

4.7 Status of Resources

The following table reflects the current strength of Air Ambulance Staff by Base:

Base	Manager	Air Ambulance Attendants			
		Full Time		Part Time	
			ALS TRG		ALS TRG
Buttonville	1	8	3	15	15
Sioux Lookout	1	9	9	2	0
Sudbury	1	8	5	6	0
Thunder Bay	1	8	8	3	0
Timmins	1 acting	8	5	6	0

The staff at the CAACC is as follows:

Manager	1 (acting)
Operating Managers	4, 1 vacant
Dispatchers	13, 2 Long Term Income Protection (LTIP)
Temporary Dispatchers	10
Secretary	1

The HQ Staff Air Ambulance Service is:

Manager	1
Supervisors	3
Admin	6

Dedicated Carriers - 2 (1 fixed wing, 1 rotary wing)
Charter Carriers - 40

89/90 Air Ambulance Service Budget - HQ, 5 Bases, Dispatch, Heliport Construction	$19,397,789
Scheduled and Charter Aircraft in and out of Ontario plus Escort expenses	$15,562,083
Total	$34,959,872

4.8 Capacity Versus Demand

A direct comparison of the capacity of the Air Ambulance Service and the demand for it proved difficult.

The provision of patient transport is illustrated in Figure 5 and 6 for the years 1981 to 1988 inclusive. The growth appears to be tapering off as was stated by the Management Staff.

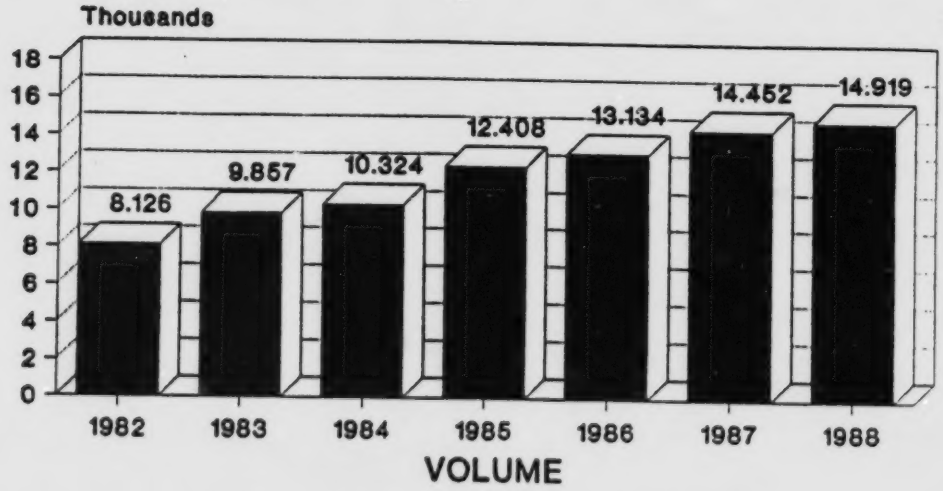


Figure 5. Air Ambulance Patient Transfers

	1982	1983	1984	1985	1986	1987	1988
Dedicated	2,171	2,843	2,462	3,656	4,232	4,595	4,544
Chartered	4,143	5,104	5,826	6,586	7,070	8,078	8,847
Scheduled	1,812	1,910	2,036	2,166	1,832	1,779	1,531
TOTAL	8,126	9,857	10,324	12,408	13,134	14,452	14,922

Figure 6. Air Ambulance Calls

Figures 7 through 14 illustrate the monthly distribution by base and by aircraft category for the same period and indicate that the monthly data are fairly consistent and show no significant seasonal characteristics.

AIR AMBULANCE CALL VOLUME

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	PERCENT
BUTTONVILLE	67	42	63	68	65	87	98	101	83	67	55	66	862	5.8%
SUDBURY	71	73	47	72	90	95	133	93	94	86	48	65	967	6.5%
THUNDER BAY	69	82	86	86	113	97	103	80	101	88	55	79	1,039	7.0%
TIMMINS	59	62	68	51	60	57	69	63	56	57	31	55	688	4.6%
SIOUX LOOKOUT	80	77	85	98	89	96	81	101	78	74	64	65	988	6.6%
TOTAL DEDICATED	346	336	349	375	417	432	484	438	412	372	253	330	4,544	30.5%
KENORA	13	9	15	19	23	44	35	15	36	16	26	11	262	1.8%
PEMBROKE	0	6	20	5	7	3	0	18	25	25	13	6	127	0.9%
MOOSONEE	14	12	11	10	11	4	12	7	7	24	13	13	138	0.9%
M.O.R.E.	4	18	8	6	10	10	22	12	18	9	7	6	130	0.9%
CHARTER	659	690	718	608	688	805	756	711	655	574	675	651	8,190	54.9%
TOTAL CHARTER	690	735	772	648	739	865	825	763	741	648	734	687	8,847	50.3%
TOTAL SCHEDULED	164	154	155	110	118	135	123	165	95	109	104	99	1,531	10.3%
GRAND TOTAL	1,200	1,225	1,276	1,133	1,274	1,432	1,432	1,366	1,248	1,129	1,091	1,116	14,922	100.0%

Figure 7. Air Ambulance Call Volume - 1988

AIR AMBULANCE CALL VOLUME - 1987

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC		TOTAL	
BUTTONVILLE	45	49	59	70	82	107	99	73	77	81	61	50	=	853	-5%
SUDBURY	69	90	82	80	80	106	108	69	80	98	66	61	=	989	26.3%
THUNDER BAY	67	81	107	65	88	101	98	96	97	103	91	99	=	1,093	12.5%
TIMMINS	59	45	65	58	77	80	84	96	60	61	45	60	=	790	8.5%
SIOUX LOOKOUT	64	48	68	58	80	75	73	97	65	77	76	89	=	870	2.1%
DEDICATED	304	313	381	331	407	469	462	431	379	420	339	359	=	4,595	8.6%
CHARTERED	645	631	668	639	629	676	757	769	684	671	634	675	=	8,078	14.2%
SCHEDULED	171	189	184	150	157	146	150	144	140	112	145	91	=	1,779	-2.9%
TOTAL	1,120	1,133	1,233	1,120	1,193	1,291	1,369	1,344	1,203	1,203	1,118	1,125	=	14,452	10%

Figure 8. Air Ambulance Call Volume - 1987

AIR AMBULANCE CALL VOLUME - 1986

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC		TOTAL	
BUTTONVILLE	59	54	72	89	80	84	112	114	66	69	56	43	=	898	24.7%
SUDBURY	57	49	55	61	63	93	66	92	55	67	70	55	=	783	22.1%
THUNDER BAY	48	47	65	71	73	110	92	112	76	105	81	91	=	971	24.8%
TIMMINS	78	56	48	51	64	63	65	78	43	70	48	64	=	728	4.9%
SIOUX LOOKOUT	76	68	68	56	90	92	92	74	60	73	55	57	=	852	3.5%
DEDICATED	318	265	308	328	307	442	427	470	300	384	310	310	=	4,323	15.7%
CHARTERED	573	499	524	527	585	589	664	610	581	643	623	652	=	7,070	7.3%
SCHEDULED	169	157	186	151	159	137	141	173	141	134	145	139	=	1,832	(15.4%)
TOTAL	1,069	927	1,018	1,006	1,114	1,168	1,232	1,253	1,022	1,161	1,078	1,101	=	13,134	5.8%

Figure 9. Air Ambulance Call Volume - 1986

AIR AMBULANCE CALL VOLUME - 1985

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC		TOTAL	1985/84 COMP. % DIFF
BUTTONVILLE	22	27	36	38	93	91	92	84	77	70	49	41	=	720	98%
SUDBURY	33	39	51	45	53	64	75	72	56	69	52	32	=	641	192%
THUNDER BAY	49	53	50	71	69	83	56	84	64	85	57	57	=	778	111%
TIMMINS	64	54	61	43	72	52	63	72	54	59	57	43	=	694	9%
SIOUX LOOKOUT	75	71	82	51	54	61	69	70	50	77	79	84	=	823	8%
DEDICATED	243	244	280	248	341	351	355	382	301	360	294	257	=	3,656	48%
CHARTERED	514	524	610	525	582	580	611	544	457	585	543	511	=	6,585	13%
SCHEDULED	197	222	181	196	164	163	182	173	179	172	181	156	=	2,166	6%
TOTAL	954	990	1,071	969	1,087	1,094	1,148	1,099	937	1,117	1,018	924	=	12,408	20%

Figure 10. Air Ambulance Call Volume - 1985

AIR AMBULANCE CALL VOLUME - 1984

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC		TOTAL	1984/83 COMP. % DIFF
BUTTONVILLE	15	23	20	25	29	43	57	44	39	20	22	25	=	362	8.5%
SUDBURY	7	14	7	13	17	27	30	28	18	21	19	18	=	219	51.1%
THUNDER BAY	19	22	19	24	30	39	37	36	18	31	50	42	=	367	36.7%
TIMMINS	66	56	59	70	61	75	69	63	64	57	61	54	=	755	2.2%
SIOUX LOOKOUT	73	51	55	71	66	72	56	86	55	58	50	57	=	759	17.3%
DEDICATED	180	166	160	203	203	256	258	257	194	187	202	196	=	2,462	13.4%
CHARTERED	452	463	393	490	539	506	484	548	454	513	482	502	=	5,826	14.1%
SCHEDULED	170	150	196	172	166	192	192	162	156	170	147	163	=	2,036	6.6%
TOTAL	802	779	749	865	908	954	934	967	804	870	831	861	=	10,324	4.7%

Figure 11. Air Ambulance Call Volume - 1984

AIR AMBULANCE CALL VOLUME - 1983

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC		TOTAL	% INCREASE
BUTTONVILLE	13	24	30	25	29	50	44	59	44	41	16	21	=	396	7.0%
SUDBURY	29	32	49	40	48	60	59	50	38	22	15	6	=	448	53.4%
THUNDER BAY	39	57	52	51	56	69	72	70	39	33	16	26	=	580	26.0%
TIMMINS	64	57	68	78	61	54	75	73	59	67	55	61	=	772	32.6%
SIOUX LOOKOUT	42	31	43	35	51	61	79	65	57	65	46	72	=	647	38.5%
DEDICATED	187	201	242	229	245	294	329	317	237	228	148	186	=	2,843	30.9%
CHARTERED	380	409	403	399	390	415	401	444	482	472	440	469	=	5,104	23.2%
SCHEDULED	190	146	202	152	148	177	157	174	137	146	155	126	=	1,190	5.4%
TOTAL	757	756	847	780	783	886	887	935	856	846	743	781	=	9,857	21.3%

Figure 12. Air Ambulance Call Volume - 1983

AIR AMBULANCE CALL VOLUME - 1982

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
BUTTONVILLE	15	23	24	27	35	40	50	49	24	34	21	28	370
SUDBURY	17	23	23	22	24	26	31	33	28	28	24	13	292
THUNDER BAY	32	41	21	51	41	38	38	49	43	41	35	30	460
TIMMINS	29	39	41	35	48	54	50	53	52	54	60	67	582
SIOUX LOOKOUT	33	35	49	33	37	36	46	37	40	48	38	35	467
DEDICATED	126	161	158	168	185	194	215	221	187	205	178	173	2,171
CHARTERED	291	291	341	286	293	363	334	398	347	399	388	412	4,143
SCHEDULED	156	139	165	145	133	148	143	154	162	146	156	165	1,812
TOTAL	573	591	664	599	611	705	692	773	696	750	722	750	8,126

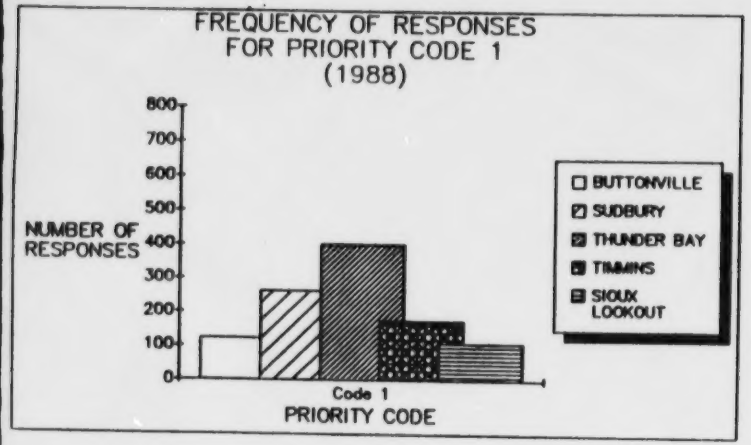
Figure 13. Air Ambulance Call Volume - 1982

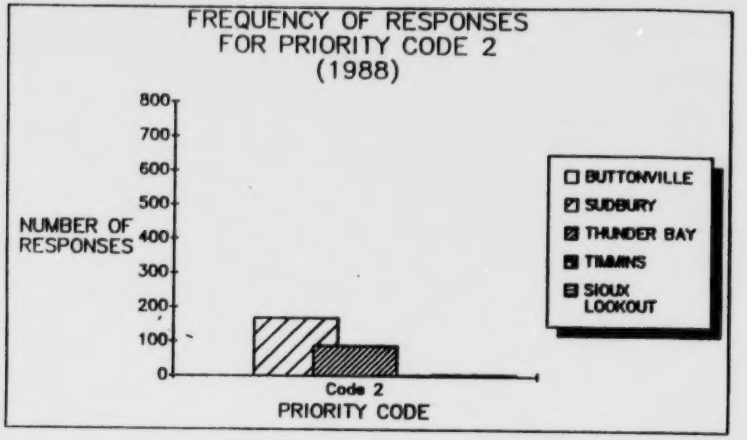
AIR AMBULANCE CALL VOLUME - 1981

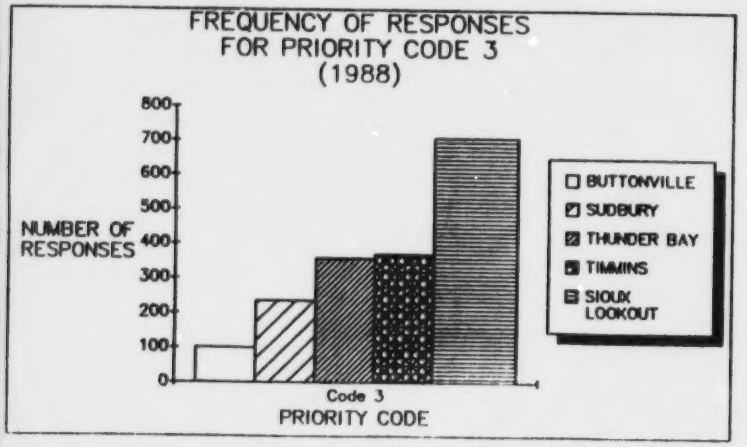
	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
BUTTONVILLE							31	25	24	26	16	17	139
SUDBURY							22	18	46	26	13	15	140
THUNDER BAY							37	39	41	33	24	14	188
TIMMINS							49	33	37	36	36	26	217
SIOUX LOOKOUT							64	50	41	29	32	23	239
DEDICATED							203	165	189	150	121	95	923
CHARTERED							308	276	267	304	281	125	1,561
SCHEDULED							109	118	122	129	139	56	673
TOTAL							620	559	578	583	541	276	3,157

Figure 14. Air Ambulance Call Volume - 1981

Figure 15 shows the distribution by code of the responses in 1988 for each Dedicated base.







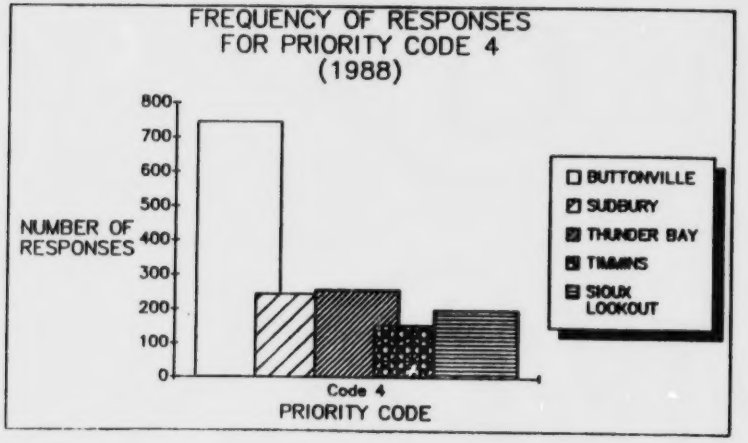


Figure 15. Dedicated Aircraft

The data for code distribution by Charter aircraft is available in the CAACC files and was requested by the Review Team, but is not normally analyzed. For 1988 there were the following data:

Code 1	6104
Code 2	705
Code 3	1327
Code 4	711
Charter Total	8847

It was noted in paragraph 4.5.4.1 that the comparable Dedicated Code distribution overall is

Code 1	766
Code 2	197
Code 3	1996
Code 4	1580
Dedicated Total	4539

Thus the Dedicated aircraft do not respond to all Codes 3 and 4, and in fact carry only 64 percent of the Codes 3 and 4. Figure 6 illustrates that the Dedicated aircraft bookings levelled off in 87/88 but that the Charter aircraft growth in bookings is continuing to grow at a steady rate of 500 bookings per year.

Figure 16 is interesting because it shows the relative growth of Air and Ground Ambulance patient transfers during 1981-1987 and illustrates the higher growth of air transport.

Calendar Year	Air Ambulance Call Volume	Land Ambulance Call Volume	Total Call Volume	Fiscal Year	EHS Printed Estimates (000's)
1981	7,606	706,634	714,240	81/82	83,100.4
1982	8,126	748,868	756,994	82/83	96,760.3
1983	9,126	791,702	801,559	83/84	106,035.6
1984	10,324	863,224	873,548	84/85	124,849.0
1985	12,408	919,804	932,212	85/86	132,778.3
1986	13,134	1,020,246	1,033,380	86/87	150,878.5
1987	14,500	1,112,000	1,126,500	87/88	170,000.0

Figure 16. EHS Information Table

Figure 17 for all Dedicated bases in 1988 indicates the demand by age groups and by medical disorder. The calls for the over 60 age represent about twenty five percent of the total which is higher than the census demographic proportion and which is likely to increase further as the demographics change.

Because no data exist on calls which could not be accommodated, the only means of judging whether the system satisfied the demand is by means of the perceptions of the providers of the service.

In the north the general comment is that calls take longer because of flight times and the most persons have the impression that there are unsatisfied calls because aircraft are not always available and because no alternate mode of transport exists.

Management staff has stated that at times there are no aircraft available and this is supported by the fact that is 1988 on average of 40 calls per day were satisfied by approximately 40 carriers. Each satisfied call requires a return flight to reposition the aircraft and when aircraft down time for maintenance, weather, and crew duty time limitations, it is conceivable that certain types of the longer haul fixed-wing flights reach capacity and cause delays or refusals.

The overtime and overwork claims of the Air Ambulance Attendants and District Managers attest to the fact that the Air Ambulance Service often operates at or beyond capacity.

It is expected that the planned computerized management information system will provide on-line reports which will enable this question of supply and demand to be assessed quantitatively. It is important to provide the means to forecast trends and to plan for growth in a businesslike way.

4.9 Perceptions

4.9.1 Methodology

The perceptions of the Air Ambulance Services staff and management, the Base Medical Directors, Air Carriers and pilots were obtained during Focus Group Interviews, or one-on-one interviews in person or by telephone when the groups could not be assembled in the short time available for the Review. Focus Group Interviews of small occupational groups of five to seven make it possible to elicit the perceptions of the occupational group.

Ordinarily, the perceptions of each occupational group are compared and where common perceptions exist in two or more groups then the common perceptions are candidate findings which should be assessed by means of discussion with management, or research of the files and other data sources such as written submissions.

Ontario of Health Ambulance Services

Patient Report

SUMMARY PROFILE FOR FIVE(5) AIR AMBULANCE BASES

Base: 8961-8965 ALL BASES.

Month of: Jan. to Dec. 19 88

AGE GROUPS	TRAUMA SINGLE	TRAUMA MULT.	CARDIAC	C.V.A.	O.B.S.	RESP.	PSYCH.	BURNS	MEDICAL	SURGICAL	OTHER	TOTAL
PREMATURE												106
TERM - 2WK												187
3WK - 5MOS												112
6MOS - 2YR												125
3YR - 6YR												111
7YR - 11YR												101
12YR - 19YR												426
20YR - 29YR												836
30YR - 39YR												532
40YR - 49YR												383
50YR - 59YR												474
60YR - 69YR												516
70YR PLUS												622
TOTAL	724	347	491	150	487	435	37	43	1,474	264	79	4,531

TOTAL CALLS: _____ TOTAL CANCELLED CALLS: _____ TOTAL PATIENTS CARRIED: _____

Figure 17. Patient Report Profile - All Bases '88

The perceptions which are unique to one occupational group should not be discarded because they provide insight into the mood of an occupational group and could be used by management to examine the effectiveness of communications with the group.

4.9.2 **Comparative Perceptions**

See page 44

4.9.3 **Summary**

The Matrix can be summarized as follows:

Training

The Air Ambulance Attendants believe that training policy and standards are lacking although they agree that the draft Policy and Procedures Manual does includes guidelines, but that District Managers interpret the guidelines, which results in inconsistencies between bases.

The Base Medical directors have provided some ALS training without standards and compensation and have the perception that funding the Base hospitals for ALS training has been a problem, and does not really reflect the cost of textbooks, syllabus, and materials. This problem was addressed by AAS Management prior to the Review.

The Air Ambulance Attendants are reluctant to take further training in ALS and survival because they believe their pay scale do not reflect the additional responsibilities.

Working Conditions

The working conditions of both Air Ambulance Attendants and District managers involve excessive overtime and overwork because of insufficient personnel resources by AAS management according to the perceptions of both groups.

Air Ambulance Attendants believe their frustration and low morale is caused by low pay scales, failure by management to honour the paring policy, anomalies in CAACC dispatch, unsatisfactory application of usage criteria and poor feedback on incident reports.

Management acknowledges these perceptions and has taken corrective action or is attempting corrective action.

Ambulance Aircraft Equipment

Equipment for medical care and aircraft interiors reflect some unsatisfactory conditions, which detract from a first class operation which management acknowledges.

Comparative Perceptions

	AIR AMBULANCE ATTENDANTS	BASE MANAGER	BASE MED. DIR.	AIR CARRIERS	PILOTS	AAS MANAGEMENT
TRAINING						
AAA Orientation lacks policy - up to Base Mgr.	✓	✓*				X
AAA Flight Training is given by dedicated carrier and is not consistent by base	✓	✓				X
AAA Survival Training left 40 NMR and AAA	✓	✓*				X
AAA High Altitude in Doc. left to Mgr. and AAA	✓	✓*				X
AAA Refresher Training						
re: Medical Case Inconsistent	✓	✓*	✓			X
Safety - No Policy	✓	✓	✓			X
AAA reluctant to take more training in ALS and survival because of pay and morale	✓	✓	✓			✓
Resources difficult to obtain for ALS Training	✓		✓			
ALS Training Standard not established	✓		✓			
Inadequate Training of Base Mgrs. in personnel management		✓				✓
Dedicated Aircraft Pilot Training conducted by Air Carriers because Air Ambulance flying is specialised and receives higher pay			✓	✓		✓
AAA Physical Fitness Exam not required after entry	✓	✓*				X
WORKING CONDITIONS						
AAA do not have duty day as do pilots	✓	✓				
AAA hours of work vary by base	✓	✓				✓
Policy for AAAs to work in pairs not honoured by Mgmt.	✓	✓				✓
Base Managers Overloaded	✓	✓				✓**
Base Mgrs. feel part of Mgmt. somedays and lack Mgmt. info re contracts, training plans, and staff relations		✓				✓
Base Mgrs. state no base audits and no appraisals by HQ		✓				✓
Ground AMB attendants required to fly by medical staff at Kenora and they are expected to fly at Red Lake and Dryden		✓	✓			✓***
Voyageur Airways considers air ambulance attendants as passengers, now crew	✓	✓				✓
Base Mgrs. try to follow spirit if ambulance Act because no air ambulance regulations		✓				✓
Pilot turnover on fixed wing aircraft is serious due to economic deregulation	✓	✓		✓		?
AAA morale an issue because of pay, pairing, dispatch, poor feedback from Mgmt. on incidents usage criteria	✓	✓	✓	✓		?
AIRCRAFT AMBULANCE EQUIPMENT						
Dedicated aircraft equipment specified by MOH, installation approved by TC, maintained under contract to Base Mgr.	✓	✓	✓	✓		?
Plastic seat covers may not be approved by AW	✓	✓				
Some rotary wing interiors badly soiled	✓	✓				✓
Bell III AAA seats poor and have no headrest	✓	✓				✓
Some rotary wing aircraft are too heat in summer and too cold in winter	✓	✓				✓
Some AA communications to base hospital not reliable	✓	✓	✓			✓

	AIR AMBULANCE ATTENDANTS	BASE MANAGER	BASE MED. DIR.	AIR CARRIERS	PILOTS	AAS MANAGEMENT
DISPATCH						
CAACC dispatchers have high turnover, not familiar with aircraft performance and limitations	✓	✓	✓	✓		✓
CAACC conflicts with local dispatch at Thunder Bay and Sudbury inspite of procedure in CAACC Manual of policy and procedures	✓	✓	✓			✓
Aircraft misused due to interpretation of priority codes by medical staff and dispatcher	✓	✓	✓	✓	✓	✓
Flight following by CAACC in some regions only possible by relay to local dispatch which causes delays	✓	✓	✓	✓	✓	X
USAGE CRITERIA						
Dedicated aircraft too often used for Codes 1 and 2 which restricts their use for Codes 3 and 4	✓	✓	✓			✓
Dedicated and charter aircraft pilots do not question usage criteria	✓	✓	✓	✓	✓	✓
ATTENDANTS (ESCORTS)						
Impreciseness of title of Air Ambulance attendants on dedicated aircraft	✓	✓	✓			✓
Qualifications for ground and Air Ambulance attendants are identical and not perceived to be adequate for air	✓	✓				
AAA believe flying is stressful and warrants higher pay than ground ambulance attendants	✓					
Charter aircraft attendants (escorts) are provided by the medical staff and may consist of ground ambulance attendants unfamiliar with aircraft, friends or relatives of the patient or no escort	✓	✓	✓	✓	✓	✓
Voyageur Airways and Canadian helicopters consider AAA as manpower under TC air regs	✓	✓	✓	✓	✓	✓
On occasion AAA are replaced by family or nurses at request of referring doctor	✓	✓	✓			
Referring doctors sometimes do not appreciate AAA role on aircraft	✓	✓	✓			
Part time AAA are not trained on dedicated Aircraft except at Buttonville	✓	✓				
INCIDENTS						
AAA do not receive adequate feedback from incidents they report	✓	X				
AUDIT PROGRAMS						
Air Ambulance operations not inspected as a system although TC does some inspection of air carriers and Air Ambulance service conduct inspection of medical equipment	✓	✓		✓		X

* Policy and Procedures Draft
** To be corrected in 89
*** Private Hospitals
X No Agreement
✓ Agree

Dispatch

The perceptions of all interviewees reflect: the high turnover of dispatchers; their non-familiarity with aircraft performance limitations, conflicts, delays or duplication with local dispatch at Bases; and misuse of Priority Codes. Management agrees except for the comments about local dispatch.

Usage Criteria

A common perception is that Dedicated aircraft are too often used for Priority Codes 1 and 2 which restricts their use for Codes 3 and 4. Management acknowledges some difficulties but considers the overall success of the operation as a positive reflection of the fact that the system is not being compromised.

Attendants (escorts)

The impreciseness of the title of Air Ambulance Attendants on Dedicated aircraft needs attention because the title Paramedics has not been officially adopted by MOH, is used for untrained part time Air Ambulance Attendants as well as those trained to perform ALS, and the Attendants perceive the result to be inadequate public awareness of their duties and responsibilities. Some medical staff have similar perceptions.

Charter aircraft Attendants are generally untrained for air transport operations. This perception is common to all interviewees.

Air Ambulance Attendants do not feel part of the crew on Dedicated aircraft, which is confirmed by the Dedicated Carriers who consider them non-crew under the TC Air Regulations.

The Air Ambulance Attendants do not feel that they enjoy the full confidence of medical staff because their role on aircraft is not fully understood.

Incidents

Air Ambulance Attendants do not feel they receive adequate feedback from incident reports. Management does not agree.

Audit Programs

The audit and inspection programs are not planned, scheduled, and conducted systematically and reflect fragmented findings according to the Air Ambulance Attendants, District Managers and some Air carriers. This perception is not shared by AAS Management.

5. COMPARISON WITH OTHER OPERATIONS

5.1 Overview

Most provinces in Canada run some form of Air Ambulance service. The exceptions are Prince Edward Island, Nova Scotia and New Brunswick where the distances to hospitals are relatively short and can easily be accommodated by road Ambulance. In these three provinces, there is extensive use made of the Canadian Armed Forces Search and Rescue Transport aircraft. New Brunswick also utilizes for a fee the Quebec Government's Air Ambulance service for the northern part of the province.

The other six provincial programs offer various level of services as depicted in Appendices C through H. As well two United Stated operations are described in appendices J and K.

5.2 Size of Operation

Ontario is by far the largest Air Ambulance operation visited or contacted for the purposes of this Review. Not only is the number of Dedicated aircraft used much larger, the number of Charter operators far exceeds the numbers used in other operations. It is a conservative estimate to state that Ontario transfers as many patients as the rest of the country put together.

5.3 Usage Criteria

Ontario appears to be the only province where a requirement for transport is decided by a physician and the mode of transport is by a dispatcher. In the two American programs visited, patients had to meet a certain medical eligibility criteria before transport was approved. Requests for Air Ambulance in Manitoba are screened for eligibility by flight nurses; in Quebec, calls are screened by a flight physician.

5.4 Dedicated Operation

In general, everyone uses a similar type of operation. Even though some are government operations, the idea is the same. However, Quebec, Manitoba, and the two American operations visited use the Dedicated operation only for the transfer of critically ill patients and have a strict medical eligibility criteria.

5.5 Charter operation

Ontario, Alberta and British Colombia are the three provinces making extensive use of Charter operations. The demography of these provinces dictates a requirement for an extensive transport system to ensure an equal level of care for everyone. The use of this service is predicated on transport and medical requirements.

5.6 Escorts

Each province has different criteria for medical escort requirement. Ontario, Alberta and British Colombia are the three operations where Ground Ambulance Attendants are almost exclusively used to escort patients. However they carry patients with assorted levels of care required. Other operations where the level of care required is always higher use at least nurses; some qualify their nurses for flight operations such as Manitoba and Quebec. The province of Quebec uses exclusively flight physicians as well as flight nurses. The province of Manitoba uses exclusively flight nurses and uses flight physicians as well on 30% of their patient transfers.

5.7 Urgency Codes

There is no standard across the country. In Ontario the most urgent code is Code 4. In British Colombia a Priority 1 is the most urgent. In Alberta there are no urgency codes.

5.8 Airworthiness

There is no standardization across the country. Every operator be they government or private charter takes care of his own aircraft modification requirements and airworthiness approval.

5.9 Aircrew

All Dedicated operations recognize Air Ambulance flying as a specialty. They almost exclusively use Dedicated aircrew for this type of work. Most have special training and orientation programs for them. Some go as far as having a higher pay scale for their Air Ambulance pilots.

6. TRANSPORT CANADA ROLE

6.1 Inspections

TC licensing and certification mandate includes the requirement to inspect Carriers in order to ensure they meet the specifications of their operating certificates. They have full control over the frequency of inspections and the information gained. The inspection reports are confidential and are not released to the public, although they are released to the inspected Carrier.

6.2 Airworthiness

Transport Canada approves all items fixed to the aircraft. The medical equipment itself is not an airworthiness item. Any stationary tie down fixture is inspected under this requirement but not in consideration of its future use. Stretchers are not an airworthiness item even though they serve the same purpose as a seat which is. Mobile medical equipment and container do not have to meet any special airworthiness requirements other than constraint.

6.3 Air Traffic Control Priority

Each province has its own emergency codes for medical emergencies and transfers. Some provinces give the highest urgency level to codes "4", others to codes "1". These codes are sometimes used for getting priority of Air traffic instead of the term MEDEVAC. There are 30,000 Air Ambulance flights per year where the call sign MEDEVAC could be used.

6.4 Cabin Attendants

Under the Air Navigation Orders, there is no requirement for Small Aircraft Carriers to operate multi-engine aircraft with Cabin Attendants unless there are more than 12 passengers being carried. The Order also states that notwithstanding the above:

"a cabin attendant shall not be required where the aeroplane is equipped with a pilot-in-command and a second-in-command station and where the aeroplane is operated by a pilot-in-command and second-in-command, if:

a) the number of passengers carried is less than 20; and

b) the Air Carrier shows that

(i) the aeroplane passenger cabin is, because of structure and loading, readily accessible from the flight deck, and

(ii) the flight crew can readily exercise adequate supervisory control over the passengers during flight time by visual and aural means."

This Air Navigation Order was prepared and approved for the intent of "Air transport" which is defined in the order as: " the carriage by aeroplane of persons or property or mail for hire or reward". Granted when a Charter operates as an Air Ambulance, it meets the definition of "Air transport". However, the intent of the Order was for commercial air services aimed at passengers with full control of their capacities. Such is not the case during Air Ambulance operations. Therefore the Order does not apply here.

6.5 Safety Management

TC, through the Directorate of Aviation Safety Programs' Regional Aviation Safety Officers, provides an excellent voluntary safety management program for commercial operators. It includes the training of personnel, the advice in the form of a consultant services, as well as the audiovisual and literature support. Refer to paragraph 4.5.4.3 for the Review Team observations concerning air carrier use of this service.

6.6 Operating Certificates

All Charter operators operate under Air Navigation Orders Series VII "Commercial Air Service Operations" which are not intended for a specialty operation such as Air Ambulance. The certification requirements do not include any conditions which would be appropriate for this type of specialty operation. TC does not recognize "Air Ambulance" as a specialty operation; there are no special conditions to be met.

The Federal Aviation Administration (FAA) of the United States has issued proposed special conditions under PART 135 for Emergency Medical Services for Airplanes (Advisory Circular 04/04/89).

7. DISCUSSION OF FINDINGS INCLUDING REFERENCES TO PREVIOUS STUDIES

7.1 Interrelationship of Summaries of Findings

Paragraph 4.2.3 summarizes the Legislative aspects of the Air Ambulance Service as lacking regulations for which the Ambulance Act makes provision.

Paragraph 4.3 records the lack of Role statement. Paragraph 4.4.5 summarizes the Organization and Management as lacking resources to complete the policies, procedures, standards, and manuals which should be required by regulation, and which under the existing administrative approach are in various stages of draft form. The resource shortfall also has mitigated against effective strategic planning and adequate forecasting and trend analyses which a formally regulated and effectively managed service would develop.

Paragraph 4.5.4.7 summarizes the Flight Operations as being comparable to a medium size commercial Air Carrier operation but that it lacks the support of a regulatory base and related standards to achieve the optimum efficiency and effectiveness, in both the medical care and flight operations.

Paragraph 4.6 provides a qualitative assessment of Charter Aircraft Safety in Ontario which is better than the national average and that of other regions. Paragraph 4.9.3 summarizes the perceptions expressed during interviews and have been supported or reflected in Findings of this Report.

Paragraph 4.7 which deals with the Status of Resources clearly shows the current strength of the Air Ambulance Service, and the cost of the service budgeted for 1989/90. A significant number of Air Ambulance Attendants have not completed ALS training at some Bases which indicates that the medical care resources are not up to strength. The HQ staff does not include aviation specialists other than the manager of AAS to conduct Air Carrier audits and aircraft inspections. Also based on information provided (15,000 patients and $34,959,872) it appears that the average cost of a patient transfer by Air Ambulance is 2300 dollars. It was not possible to analyze the relative costs of Dedicated and Chartered Aircraft or the relative costs of the priority codes.

Paragraph 4.8 analyzes the supply and demand date for the Air Ambulance service over the period 1981 - 1988. The data is adequate enough to enable the following observations:

(i) Growth appears to be flattering out

(ii) The Dedicated aircraft growth has slowed significantly while the Chartered aircraft growth is averaging an increase of 500 transfers per year.

(iii) The Chartered aircraft are moving more than 50 percent of the codes s and 4 patients

(iv) The distribution of codes by Base for Dedicated aircraft show a significant difference in concentration which is not reflected in the capacity of the Air Ambulance Attendants with ALS training.

7.2 Relationship to Previous Studies

7.2.1 The NTSB Study

The United States' National Transportation Safety Board (NTSB) has conducted a Safety Study on "Commercial Emergency Medical Service (EMS) - Helicopter Operations" which deals specifically with safety deficiencies in operations. Its findings are based on data obtained through the examination of numerous accident reports, the experience gained through visits and operational flying, and through a literature search. Some of the recommendations to the FAA were:

> "that material being developed for the EMS pilot supplement to the Aeronautical Decision Making manual for helicopter pilots be incorporated into EMS pilot initial and recurrent training";
>
> "develop minimum EMS helicopter equipment installation and performance standards";
>
> "Require that those personnel classified as required crewmembers operating EMS helicopters wear protective clothing and equipment to reduce the chance of injury or death in survivable accidents. This clothing and equipment should include protective helmets, flame and heat resistant flight suits, and protective footwear."

The report goes on to recommend to the Association of Air Medical Services (AAMS) and to the Helicopter Association International (HAI) to:

> "develop guidance for members who operate EMS programs on recommended training for medical personnel who routinely fly on EMS helicopter missions. This guidance should be developed in conjunction with the FAA. Topics that should be addressed include:
>
> - flightcrew and medical personnel coordination and communication including terminology to be used;
> - helicopter emergency fuel and systems shutdown, landing zone safety and obstacle avoidance, Air traffic recognition and avoidance, and radio communications; and
> - emergency training on topics listed in Title 14 Code of Federal Regulations Part 135.331, Crewmember Emergency Training."

7.2.2 The Shapiro Report:

Commissioner Jack R. Shapiro was tasked by the OPSEU to conduct a Public Inquiry into Ambulance and Emergency Health Services Delivery in the Province of Ontario. The Report was published on June 1, 1988.

Although the aim of the Inquiry was different than the present Review and mostly aimed at the road Ambulance system which is an emergency response system rather than a patient transfer system such as the Air Ambulance, some statements made in the Shapiro Report are applicable to this Review. For instance, the Inquiry concludes:

"It is probably not possible to achieve consistency in the level of service provided in a structure:

- that involves six different forms of ownership of the Ambulance services within the province;
- where full funding comes from the Ministry, which has no firm goals or policies upon which to base the allocation of vehicles and staff;
- where there is great inconsistency in the training of Ambulance Officers and the provision of Advanced Life Support Services."

This Review, differs with the Report, since it believes that a consistent Air operation could be achieved with proper regulations, standards, policies and qualified personnel.

Some of the problems identified in this Report relate directly to the findings of this Review, for example:

"Ambulance Officers suffer from severe frustration, resentment, low self-image and stress."
"Ambulance Officers do not receive compensation for each ALS skill acquired."
"The Ministry does not provide training programs for Ambulance service managers in enlightened staff management practices."

7.2.3 Association of Air Medical Services:

The Association of Air Medical Services (AAMS) based in the U.S. is a voluntary non-profit organization built on the idea that representation from a variety of Air transport services and businesses can be brought together to share information, collectively resolve problems and provide leadership in the Air medical industry. This is achieved through caring, voluntary members who network formally and informally to share information for the advancement of the industry.

AAMS has provided a leadership role in the submission to the FAA for the promulgation of regulations dealing with Air Ambulance operations. In addition, AAMS has published a set of Air Medical Standards (APPENDICES M, N and O). Also, Training Manuals written by professionals have been published and are available through the Association.

Furthermore, the Association sponsors conferences which deal with management and operational topics (APPENDIX P).

7.2.4 Ontario Ombudsman Report on his Investigation into the Complaint of National Helicopters Incorporated

As was quoted in paragraph 4.5.2 from the Ombudsman Report, the Report is supportive of the proposal evaluation process used for Dedicated Aircraft Carriers.

7.3 OPSEU Submission to the Review Team

The OPSEU Brief was received forty eight hours prior to the scheduled submission of this report to the Ministry of Health. The Brief reflects perceptions held by the Air Ambulance Attendants already reported in paragraph 4.9.2.

8. CONCLUSIONS

The following conclusions are based upon Findings, their analysis and the relevance of previous studies, the comparison with other operations, and the TC Role.

8.1 No specific regulations have been formulated under the provisions of Section 22 of the Ambulance Act (1980) of Ontario.

8.2 No role statement exists for the Air Ambulance Service.

8.3 The current arrangement between MOH and MNR with respect to the "Standards for Commercial Aircraft" does not compensate for the deficiency in regulations, standards and policies.

8.4 The current administrative process for contracting with the Air carriers may lend itself to subjective decisions in selection, inspection, and sanctions.

8.5 The Air Ambulance Service Organization personnel other than the Manager lack specialist aviation skills for a comprehensive air transportation operation.

8.6 The training of Dedicated Aircraft Air Ambulance Attendants and Chartered Aircraft Medical Escorts lacks adequate province-wide criteria for course content, selection standards, examinations, certification, and continuation training.

8.7 The District Managers are not provided formal training in personnel management, resource management, and related management skills

8.8 The CAACC does not include personnel qualified in Air operations and medical care capable of providing effective interpretation of the usage criteria priority codes.

8.9 The Chartered aircraft are providing more than fifty percent of the priority codes 3 and 4 patient transfers irrespective of the fact that they are considered as a different type of service than the Dedicated Aircraft.

8.10 The weakness in communication skills of Management with staff and medical care personnel give rise to many of the perceptions expressed during interviews.

8.11 The MOH Air Ambulance Service is the largest and most complex of the Ambulance operations examined and although it lacks the formal policies, standards, and practices of the smaller operations, it has successfully transported 85,000 patients during the period 1981-1988 without a patient fatality due to aircraft operations. However, flight crew and Attendants suffered fatalities in two recent accidents.

8.12 Transport Canada regulations, standards and safety programs do not reflect the special requirements of Air Ambulance operations.

8.13 The safety record of Ontario based Charter aircraft operators is better than the national average and that of other regions.

Note: Findings involving detailed subject matters contributed to conclusions 8.1 to 8.12 and may be found throughout this report.

9. RECOMMENDATIONS

The Review Team recommends that:

9.1 Regulations should be made by the Minister of Health under the provisions of Section 22 of the Ontario Ambulance Act (1980).

9.2 The role, standards, policies, procedures, related to the special requirements of the Air Ambulance operation should be reviewed under the proposed enabling regulations.

9.3 The personnel resources, selection, training, certification and performance standards should be reviewed and enhanced to provide the strength and specialist skills needed for current and forecast demands.

9.4 In addition to the Air Ambulance Attendant requirement, all Air Ambulance aircraft should be crewed with cabin attendant qualified in accordance with ANO Series VII.

9.5 The communications networks and skills of Staff, Medical Staff and Contractors' personnel throughout the Air Ambulance Service should be overhauled.

9.6 Advice should be obtained to assist in the development and implementation of a comprehensive system safety management by the AAS and the Carriers.

9.7 A strategic AAS plan embracing trend analysis, forecasting, and costing should be developed to enable the adoption of effective and efficient usage criteria.

9.8 The Association of Air Medical Services should be considered as an ongoing means to access the developments in other Air Ambulance systems.

APPENDIX A

Charters Survey Checklist

CHARTERS SURVEY CHECKLIST

General

Concern is related to

a. Selection of Air Ambulance Carriers
b. inspection of Air Ambulance Carriers
c. Management of Air Ambulance System as they relate to the service to and safety of the patient

Two types of Carriers involved, namely those "dedicated" to provide a service and those who are "chartered" with a standing offer contract to provide a service. The "dedicated" normally handle the urgent cases (Code 3 & 4).

CHECK LIST

1. Is the selection process for the 'dedicated' and 'charter' carriers adequate to provide a firm base for the necessary safety by the Patient.

2. Do you feel that the system would be better off, from a patient point of view, if it was all operated, including the aircraft, by the Ontario Government???

3. Do you feel that the standards used by the DOT and the AAS are adequate to cover the safety that the patient expects?

    - the Ambulance Act
    - is the aircraft choice consistent with role?
        - icing
        - balanced field length
        - Cat A or B helicopter
        - IFR on helicopters
    - incident reporting and recording
    - emergency equipment installation requirements
    - Company safety programs requirements,
        - the DOT Safety Promotion Course,
        - the control of incidents adequate,
        - the additional pilot qualifications
    - the maintenance approval system
    - how much of your own maintenance do you do
    - the auditing/inspection system (DOT/AAG)

4. Do you feel that the "auditing system" which includes three agencies (DOT, AAS and Ministry of Natural Resources) as they apply to Air Ambulance safety, as attaining its objective. Are they quality audits or just a nuisance?

5. Do you feel that the discrepancies found in the 'audits/inspections' are handled in a expeditious manner and in a manner that improves the safety, versus handling the paper aspects.

6. Does a pilot have a tendency to "press on", because it is some form of a medical emergency thereby perhaps violating the DOT standards or perhaps his companies?

   - are the pilots free to decide based on safety or does the potential consequences of not going weigh heavily (either financially or patient)
   - are they specially trained to judge the situation
   - does the company have "safety seminars" to discuss these matters and the difficult situations that sometimes develop
   - weather information
   - do pilots ensure that all patients and attendants are strapped in according to Air Regulations not withstanding what Dr., nurses or the paramedics consider best
   - do paramedics get any special training with respect to aircraft emergency procedures etc.

7. Where does the system need to be changed in order to improve the service and safety for the patient.

8. Any other thoughts on the whole question of Air Ambulance Service in Ontario or anywhere else.

APPENDIX B

Dedicated and Other Programs Survey Checklist

DEDICATED AND OTHER PROGRAMS SURVEY CHECKLIST

1. Definition of the role
2. Area of operation
3. Standards and procedures used
   - clearly defined and enforced
   - use of pilot's discretion
   - setting of wx minimums
   - duty day; shift schedule
   - hot loading
4. Contracting methods
   - follow up activities
   - selection
   - inspection
   - specifications for minimum levels of safety performance
5. Manual of operations
6. Method of operation
   - dispatch system; provision of wx info, records of wx conditions at time of dispatch as a control method
   - flight watch
   - mission influence; try second company if first one refuses
7. Usage criteria
   - pilot's involvement in decision making
   - terms of reference for users
   - attendant's role
8. FAA role and responsibilities; Part 135
9. TC role and responsibilities; small air carrier
10. Safety management
    - policy, organization
    - safety officer
    - safety program, plan
    - reporting system
    - investigation of occurrences
    - analysis of occurrences
    - feedback system

- safety education/training
- safety inspections
- safety budget
- safety information
- contingency planning

11. Staffing and training

- dedicated flight crew; dedicated attendants
- experience of pilots; median flight time; ratings
- "crewmembers" or "passengers" for training purpose
- special training that prepare pilots for the job
- pay and benefits

12. Control methods

- inspection frequency
- enforcement
- records
- follow up
- communications; education
- training on inspection methods

13. Communications

- meetings between medical and flight personnel on a regular basis
- flight crew away from own management but close to medical management
- pilot's knowledge of patient condition for altitude, temperature, turbulence etc, consideration of seriousness of illness or injury.

14. Interaction between all participants

- CRM, PDM, crew interaction training including attendants
- education of managers on the negative pressures on flight crews and other flight safety concerns
- team loyalty

15. Airworthiness standards

- STCs; major alterations and repairs; design approved standards
- technical design standards
- approval process used

16. Special equipment

- aircraft configuration; modifications for patient care
- AC & DC requirement
- oxygen; warning devices
- suction
- lighting
- monitor plug ins
- dangerous goods

- interface of medical equipment with aircraft systems
- systems approach to design of medical equipment
- safety equipment; shoulder harness and helmets
- protective clothing; survival gear
- crashworthy fuel systems
- interior design; protruding hooks etc.

17. Operations' statistics

- no. of hospital transfer
- no. of emergency pick ups
- etc.

APPENDIX C

Air Ambulance Operations - Newfoundland

AIR AMBULANCE OPERATIONS

Dedicated:	Newfoundland
role:	to provide emergency and urgent transport in response to medical needs of the patients.
area:	the province of Newfoundland and Labrador.
statistics:	700 patients per year, 100% hospital to hospital transport, 29% government aircraft 34% contract helicopter 29% charter aircraft 8% commercial and others.
dedicated aircraft:	King Air A-100
crew complement:	2 pilots, 1 escort provided by referring hospital.
staffing:	Pilots: captains: class 1, ATR, multi-eng., 2000 hrs. flight time, 1000 hrs. PIC, 100 hrs. instrument. Co-pilots: class 1, commercial lic., multi-eng, 500 hrs. flight time.
training:	Pilots: no special requirement for air ambulance operations. Escorts: nil.
communications:	no special requirement; medical staff is always different.
usage criteria:	yes, but rely on diagnosis of referring physician.
audits:	reviewed periodically by Director of Air Ambulance operations.
contract charter:	yes.
selection:	RFP, standing offer list, helo. or pressurized aircraft.
inspection:	rely on TC.
control:	no special procedure.
safety management:	
internal:	no formal program.
contract charter:	no special program required.
airworthiness:	
dedicated aircraft:	partially modified by Air Division, signed by B AME, did not seek any special approval.
contract charter:	nil required.
special equipment:	stretcher, inverters, hookups.

method of operation, dispatch:

ON CALL LIST published every two months, persons on call not medical persons; call goes to person on call; person on call evaluates necessity, then calls Air Division; pilots on standby on pager; when the call comes, the medical decision to go has already been made; pilots carry out normal pre-flight procedures; pilots decide go no-go based on flight safety requirements; aircraft launches.

APPENDIX D

Air Ambulance Operations - Quebec

AIR AMBULANCE OPERATIONS

Dedicated:	Quebec
role:	to transfer urgent and unstable patients to specialized and highly specialized hospitals in Quebec city and Montreal.
area:	the province of Quebec including the Madeleine Islands, and northern New-Brunswick.
statistics:	750 patients per year. 100% hospital to hospital transfers.
dedicated aircraft:	Challenger 601 fully equipped ICU, backup F27 with mobile equipment.
crew complement:	2 pilots, 1 physician, 1 nurse.
staffing:	Pilots: captains: ATR, 1000 hrs. PIC aircraft >18,000 lbs, 4000 hrs. flight time for F27, 5000 hrs. flight time for jet. Co-pilots: 3000 hrs. flight time. Nurses: emergency care, neonatal care, aviation medicine, orientation program in air operations, evacuation, etc...
communications:	crew concept.
usage criteria:	urgent and unstable cases where it is impossible to transfer by other means.
audits:	at the same time as the request; all requests are answered and verified by a qualified flight physician.
contract charter:	yes, responsibility of requesting physician.
selection:	unknown.
inspection:	unknown.
control:	unknown.
safety management:	yes.
internal:	safety deficiencies are reported to chief pilot.
contract charter:	unknown.
airworthiness:	
dedicated aircraft:	through INNOTECH.
contract charter:	unknown.
special equipment:	full ICU equipment.

method of operation, dispatch: call comes to dispatch manned 24 hours a day; screening physician returns call within 5 minutes; screening physician determines eligibility of patient; crew on page ready to launch within 1 hour; computerized flight planning provides all necessary flight data to pilots; pilot makes his go no-go decision; physician briefs pilot on patient condition and requirements; aircraft launches.

APPENDIX E

Air Ambulance Operations - Manitoba

AIR AMBULANCE OPERATIONS

Dedicated:	Manitoba
role:	to provide exemplary health care for patients during all phases of inter-facility air transportation.
area:	outside an 80 mile/130 km radius of Winnipeg and province wide.
statistics:	625 patient per year. 100% hospital to hospital.
dedicated aircraft:	Citation S II
crew complement:	2 pilots, 1 flight nurse, 1 physician 30% of flights.
staffing:	Pilots: attrition is very low; air ambulance pilots are selected from within the Air Division as much as possible; criteria: multi.eng class 1 IFR, 500 hrs. PIC on multi.eng, 1500 hrs. total. Nurses: attrition is very low; criteria:graduate registered nurse, 9 to 12 month course on ICU or emergency post graduate course, 5 years of experience. Physicians: emergency care, neonatal care and ICU experience.
training:	Pilots: extensive interaction training, CRM, PDM; First responders course, ambulance orientation; interaction training with nurses; Nurses: aeronautical training including IFR procedures, safety equipment, survival etc; 8-10 weeks of orientation and indoctrination including road attendant's course. Physician: aeronautical training including IFR procedures, safety equipment, survival etc.
communications:	pilots and medical staff operate as a team; they train together in aircraft evacuation. Pilots receive cockpit resource management training and other similar human interaction type training.
usage criteria:	clearly explained in nurses' policy manuals; physicians and all users have been briefed on the service; nurses receive the requests and determine eligibility criteria; debriefings on previous operations are carried out.

audits:	flight nurse supervisor reviews all airevac documentation to verify eligibility.
contract charter:	contracts only on rare occasions.
selection:	charter are selected based on verified performance.
inspection:	inspected before any contract given.
control:	debriefing of accompanying medical staff.
safety management:	
internal:	TC trained CASO appointed as safety officer; a full safety management program is in place.
contract charter:	unknown.
airworthiness:	
dedicated aircraft:	own STC for the Citation SII.
contract charter:	TC requirement.
special equipment:	factory equipped to high medical standards.
method of operation, dispatch:	Call comes to Manitoba Air Division; standby crews are advised immediately; nurse checks patient data to ensure eligibility for transport; nurse checks with recommending physician patient ready for transport; meanwhile pilot checks the weather and aircraft; pilot and nurse meet, they each give their GO NO-GO decision; together they make final GO NO-GO decision; they brief each other's requirements, pilot is fully aware of patient's condition; aircraft launches.

APPENDIX F

Air Ambulance Operations - Saskatchewan

AIR AMBULANCE OPERATIONS

Dedicated:	Saskatchewan
role:	to provide transportation for residents requiring medical care.
area:	the province of Saskatchewan.
statistics:	government aircraft 600 per year; charter 400 per year.
dedicated aircraft:	Piper Cheyenne, back up Piper Cheyenne.
crew complement:	2 pilots, 1 flight nurse
staffing:	Pilots: captains: 3500 hrs. flight time, 1500 hrs. multi-eng., 500 hrs. turbine, 500 hrs. instrument. Nurses: registered nurses, ICU and coronary care experience.
training:	Pilots: no special training for air ambulance. Nurses: orientation program, evacuation etc...
communications:	crew concept.
usage criteria:	physician referral, all requests are valid and accepted.
audits:	nil requirement.
contract charter:	yes, Government supplies the equipment and the nurse.
selection:	not formalized.
inspection:	rely on TC.
control:	no special procedure.
safety management:	
internal:	safety officer appointed, no reporting system, no formal program.
contract charter:	unknown, nil contract requirement.
airworthiness:	
dedicated aircraft:	STC approved through Pearisso Aviation Calgary.
contract charter:	unknown.
special equipment:	mobile ambulance package.

method of operation, dispatch:

call comes to dispatch, nurse answers the phone; nurse takes patient information, destination etc.; pilot gets pre-flight information; pilot decides go no-go; nurses informs pilot on special patient requirements; aircraft launches.

APPENDIX G

Air Ambulance Operations - Alberta

AIR AMBULANCE OPERATIONS

Dedicated:	Alberta
role:	to provide transport for patients in urgent life threatening situations, in urgent non life threatening situations who can't be transferred by other means, and, non urgent non life threatening situations but medical equipment has to be transferred to them.
area:	the province of Alberta.
statistics:	3600 transfers per year. 500 by dedicated type operations.
dedicated aircraft:	Cheyenne II.
crew complement:	2 pilots, medical escort as determined by referring hospital.
staffing:	Pilots: captains: 2000 hrs. total flight time; 100 hrs. on flight time on type. Escorts: unknown.
training:	Pilots: mandatory orientation training every 6 months (1/2 day per session). Escorts: mandatory orientation training every 6 months (1/2 day per session).
communications:	medical team are considered passengers.
usage criteria:	transportation provided on physician authority.
audits:	patient form completed every trip; it provides data on patient, type of transfer; if approved, then the trip is paid for.
contract charter:	yes
selection:	no special process; referring hospital calls its local charter.
inspection:	nil required.
control:	nil in place.
safety management:	nil required.
internal:	nil in place.
contract charter:	unknown.

airworthiness:	
dedicated aircraft:	carrier own responsibility.
contract charter:	charter own responsibility.
special equipment:	carrier own responsibility.
method of operation, dispatch:	local hospital calls local dedicated or charter; dedicated or charter react the same way as any other type of requests; aircraft launches.

APPENDIX H

Air Ambulance Operations - British Columbia

AIR AMBULANCE OPERATIONS

Dedicated:	British Colombia
role:	to move patients by air when it is either medically desirable or economically advisable.
area:	the province of British Colombia.
statistics:	5600 patient per year. 78% hospital to hospital, 20% emergency pick up, 2% others.
dedicated aircraft:	Government Aircraft
crew complement:	charter
staffing:	Pilots: RFP requirement, not verified; criteria: class 1 IFR, captain: 2000 hrs. total, 100 hrs. on type. Co-pilot: 500 hrs. total, 50 hrs. on type. Immunization requirement: smallpox, tetanus, diphtheria and poliomyelitis, free from communicable diseases.
training:	nil requirement.
communications:	impersonal relationship; attendants are road ambulance attendants and are different ones on every flight.
usage criteria:	response to referring physician; left at discretion of referring physician to follow procedure outlined in the manual " A guide to transporting patients ".
audits:	nil verification.
contract charter:	approximately 70% of transfers; used for most urgent cases.
selection:	RFP only.
inspection:	some at the discretion of consultant; no formal inspection.
control:	no special procedure.
safety management:	
Internal:	Unknown
contract charter:	left at their own discretion.

airworthiness:

dedicated aircraft:	Unknown
contract charter:	left at discretion of operator. Meets TC standards.
special equipment:	left at discretion of operator.
method of operation, dispatch:	call handled just like ground ambulance request; dispatcher arranges for aircraft as requested; dedicated or charter meets patient and attendant if any at designated pick-up point.

APPENDIX J

Air Ambulance Operations - U.S. Life Link III

AIR AMBULANCE OPERATIONS

Dedicated:	LIFE LINK III
role:	to provide an intensive care system for inter-hospital transfer and trauma scene response.
area:	<150 miles = helicopter >150 miles = airplane maximum =
statistics:	3000 patient transport per year. Specialize in hospital to hospital transport.
dedicated aircraft:	S76 helicopter, King Air.
crew complement:	1 LL3 pilot, 1 contract pilot, 2 flight nurses.
staffing:	Pilots: captains' unknown, co-pilots are contract pilots trying to build their hours. Nurses: criteria: registered nurse, emergency medical training, years of experience in ICU.
training:	captains: orientation training, some have taken the registered emergency medical technician course; CRM, Decision Making courses. Co-pilots: nil required. nurses: 7 weeks hands on orientation training.
communications:	crew concept, except for the co-pilot.
	Training: CRM, PDM, other similar training; some training is carried out as a crew, pilots and nurses together.
usage criteria:	clearly laid down criteria; nurse dispatcher receiving the call goes through criteria checklist with referring authority; nurse dispatcher decides on eligibility based on the criteria; all info on the request is entered on a computer.
audits:	computer program for up to the minute audit.
contract charter:	
selection:	selected charter.
inspection:	chief pilot inspects potential contractors.
control:	feedback from users.
safety management:	
internal:	full safety management program, including reporting system and feedback.
contract charter:	left to company.

airworthiness:

dedicated aircraft:	own STC.
contract charter:	left to company and FAA.
special equipment:	fully equipped.

method of operation, dispatch: call comes to LL3; dispatch nurse advises pilot of possibility of a launch with route and destination; pilot checks weather and aircraft; meanwhile nurse determines eligibility of patient; nurse ensures patient ready for transport; pilot is briefed on special requirements for the flight, pilot is not briefed on patient's condition; if pilot approves aircraft launches.

APPENDIX K

Air Ambulance Operations - U.S. Life Flight

AIR AMBULANCE OPERATIONS

Dedicated:	LIFE FLIGHT
role:	to provide rapid transportation for critically ill and injured patients needing immediate specialized care.
area:	< 130 miles = helicopter (204 Hospitals) > 130 miles = airplane maximum =
statistics:	2300 patient transport per year, 85% hospital to hospital, 15% emergency scene.
dedicated aircraft:	3 BK 117 twin helicopter.
crew complement:	1 pilot, 2 flight nurses.
staffing:	Pilots: RFP requirement; criteria: IFR rated, others unknown. Nurses: attrition is very low; criteria: graduate registered nurse, 3-5 years of critical experience.
training:	Pilots: orientation program. Nurses: 2 weeks of ground school, including aircraft systems; 5 weeks of one on one training; continuation training while on standby.
communications:	Crew concept. Training: CRM, PDM, other similar training; some training is carried out as a crew, pilots and nurses together.
usage criteria:	clearly laid down criteria; LF trains "qualified responders" as persons authorized to request the service, they are the only ones the dispatcher will accept a request from; all info on the request is entered in a computer for later audits.
audits:	computer records are audited from time to time.
contract charter:	yes.
selection:	only one is used.
inspection:	yes.
control:	unknown.

safety management:

internal:	Rocky Mountain complete safety program, including reporting and feedback system.
contract charter:	unknown.

airworthiness:

dedicated aircraft:	through Rocky Mountain.
contract charter:	unknown.
special equipment:	through Rocky Mountain.

method of operation, dispatch: call comes to LF; dispatch advises standby crews; pilot checks the weather; dispatcher provides required information for pilot and nurses; pilot makes GO NO-GO decision, pilot is not briefed on patient's condition, he is briefed only on special requirements; aircraft launches.

APPENDIX L

1988 Ontario Patient Transfers By Codes

1988 PATIENT TRANSFERS

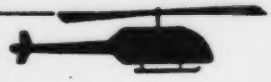
BY CODES:

Codes	Dedicated	Charter
1	766	5631
2	197	631
3	1996	1221
4	1580	690
	4539	8173

APPENDIX M

AAMS STANDARDS FIXED WING

Association of Air Medical Services



STANDARDS
Fixed Wing

The following minimum Standards, presented here in outline form, have been developed by the Association of Air Medical Services to serve as reference for the development and continuing operation of an air medical service. These Standards are intended to assure the quality of patient care and the safety of both crew and patients(s).

STANDARD I

THE AIRCRAFT DESIGNATED FOR THE AIR MEDICAL MISSION MUST BE EVALUATED CAREFULLY, CONSIDERING THE GEOGRAPHIC AREA TO BE SERVED, THE TYPE OF MISSIONS IT IS TO PERF[illegible] AND THE CREW AND EQUIPMENT IS MUST CARRY.

STANDARD II

THE AIR MEDICAL CREW SHALL BE WELL ORGANIZED, PROPERLY DIRECTED AND STAFFED ACCORDING TO THE NATURE AND EXTENT OF HEALTH CARE NEEDS ANTICIPATED AND THE SCOPE OF SERVICES OFFERED.

STANDARD III

STAFFING THE FIXED-WING AIR MEDICAL UNIT MUST BE COMMENSURATE WITH THE LEVEL OF CARE OFFERED.

STANDARD IV

ALL TRAINING AND EXPERIENCE REQUIREMENTS MUST BE COMMENSURATE TO THE CRITICAL CARE, ADVANCED LIFE SUPPORT, SPECIALTY CARE AND BASIC LIFE SUPPORT AIRBORNE ENVIRONMENT AND MUST BE DOCUMENTED AND APPROVED BY THE PROGRAM MEDICAL DIRECTOR AND IN THE PROGRAM'S POLICY AND PROCEDURE MANUAL.

STANDARD V

POLICIES AND PROCEDURES ADDRESSING PATIENT TRANSPORT ISSUES INVOLVING COMMUNICABLE DISEASES, INFECTIOUS PROCESSES AND HEALTH PRECAUTIONS FOR EMERGENCY PERSONNEL AS WELL AS FOR PATIENTS MUST BE WRITTEN AND READILY AVAILABLE TO ALL MEMBERS OF THE AIR MEDICAL SERVICE. ADDITIONAL MEDICAL AND AGENCY RESOURCES PERTINENT TO THE AREA OF INFEC-

TION CONTROL MUST BE IDENTIFIED AND MADE AVAILABLE IN THE POLICY MANUAL TO ALL MEMBERS OF THE AIR MEDICAL TEAM.

STANDARD VI

A SIGNIFICANT COMMITMENT OF RESOURCES IS REQUIRED OF THE SPONSOR OF AIR MEDICAL SERVICE(S). APPROPRIATE SERVICES SHALL BE RENDERED WITHIN THE DEFINED CAPABILITIES OF THE SERVICE TO INSURE CONTINUITY AND SMOOTH TRANSITION OF CARE.

STANDARD VII

THE QUALITY AND APPROPRIATENESS OF PATIENT CARE PROVIDED BY THE AIR MEDICAL SERVICE SHALL BE CONTINUOUSLY REVIEWED, EVALUATED AND ASSURED THROUGH THE ESTABLISHMENT OF A QUALITY CONTROL MECHANISM.

STANDARD VIII

THE AIR MEDICAL SERVICE SHALL STRIVE FOR FULL INTEGRATION INTO EXISTING EMERGENCY MEDICAL SYSTEMS AND INTER-HOSPITAL TRANSFER NETWORKS.

STANDARD IX

AN ORGANIZED AND STRUCTURED PLAN MUST BE DEVELOPED TO ACCESS THE AIR MEDICAL SERVICE, FILE FLIGHT PLANS, PROVIDE FLIGHT FOLLOWING, INITIATE OVERDUE AIRCRAFT PROCEDURES, AND COMMUNICATE PERTINENT DATA BETWEEN THE AGENCY, THE AIRBORNE FLIGHT CREW AND THE RECIPIENT AGENCY.

STANDARD X

A PROFESSIONAL AND COMMUNITY EDUCATION PROGRAM MUST BE DEVELOPED THAT WILL PROMOTE PROPER AIR MEDICAL SERVICE UTILIZATION.

STANDARD XI

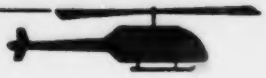
THE AIR MEDICAL CREW WILL APPROACH THE MISSION WHERE HAZARDOUS MATERIAL IS SUSPECTED OR KNOWN TO EXIST IN SUCH A MANNER SO AS TO ENSURE THE SAFETY OF THE CREW AND AIRCRAFT AS THE PRIMARY CONSIDERATION. A STRUCTURED PROGRAM FOR RESPONDING TO THE PATIENT(S) INVOLVED IN A HAZARDOUS MATERIAL INCIDENT MUST BE IN PLACE, WITH POLICIES AND PROCEDURES CLEARLY OUTLINED AND AVAILABLE FOR THE PILOT AND MEDICAL CREW PRIOR TO LIFT OFF.

Provider members will receive a complete copy of the Standards & Safety Quidelines upon acceptance of membership. Other members & interested parties may purchase a copy from the AAMS National office. The cost is $25.00 per copy. 3/89

APPENDIX N

AAMS STANDARDS ROTORCRAFT

Association of Air Medical Services



STANDARDS
Rotorcraft

The following minimum Standards, presented here in outline form, have been developed by the Association of Air Medical Services to serve as reference for the development and continuing operation of an air medical service. These Standards are intended to assure the quality of patient care and the safety of both crew and patient(s).

STANDARD I

THE AIRCRAFT DESIGNATED FOR THE AIR MEDICAL MISSION MUST BE EVALUATED CAREFULLY, CONSIDERING THE GEOGRAPHIC AREA TO BE SERVED, THE TYPE OF MISSIONS IT IS TO PERFORM AND THE CREW AND EQUIPMENT IT MUST CARRY.

STANDARD II

THE AIR MEDICAL CREW SHALL BE WELL ORGANIZED, PROPERLY DIRECTED AND STAFFED ACCORDING TO THE NATURE AND EXTENT OF HEALTH CARE NEEDS ANTICIPATED AND THE SCOPE OF SERVICES OFFERED.

STANDARD III

STAFFING THE AIR MEDICAL UNIT SHALL BE COMMENSURATE WITH THE MISSION'S PATIENT CARE NEED AFFORDED BY THE AIRBORNE FACILITY. THE AIRCRAFT, BY VIRTUE OF MEDICAL STAFFING AND RETROFITTING, BECOMES A PATIENT CARE UNIT.

STANDARD IV

ALL TRAINING AND EXPERIENCE REQUIREMENTS MUST BE COMMENSURATE WITH THE MISSION PROFILE AND AIRBORNE ENVIRONMENT AND MUST BE DOCUMENTED AND APPROVED BY THE PROGRAM MEDICAL DIRECTOR AND IN THE PROGRAM'S POLICY AND PROCEDURE MANUAL.

STANDARD V

POLICIES AND PROCEDURES ADDRESSING PATIENT TRANSPORT ISSUES INVOLVING COMMUNICABLE DISEASES, INFECTIOUS PROCESSES AND HEALTH PRECAUTIONS FOR EMERGENCY PERSONNEL AS WELL AS FOR PATIENTS MUST BE CURRENT WITH THE LOCAL STANDARD OF PRACTICE. INFORMATION MUST BE WRITTEN AND READ-

ILY AVAILABLE TO ALL MEMBERS OF THE AIR MEDICAL SERVICE. ADDITIONAL MEDICAL AND AGENCY RESOURCES PERTINENT TO THE AREA OF INFECTION CONTROL MUST BE IDENTIFIED AND MADE AVAILABLE IN THE POLICY MANUAL TO ALL MEMBERS OF THE AIR MEDICAL TEAM.

STANDARD VI

A SIGNIFICANT COMMITMENT OF RESOURCES IS REQUIRED OF THE SPONSORING INSTITUTIONS. APPROPRIATE SERVICES SHALL BE RENDERED WITHIN THE HOSPITALS, THE DEFINED CAPABILITIES OF THE SPONSORING HOSPITAL, AND/OR OTHER HOSPITALS WITHIN THE SERVICE REGION.

STANDARD VII

THE QUALITY AND APPROPRIATENESS OF PATIENT CARE PROVIDED BY THE AIR MEDICAL SERVICE SHALL BE CONTINUOUSLY REVIEWED, EVALUATED AND ASSURED THROUGH THE ESTABLISHMENT OF A QUALITY CONTROL MECHANISM.

STANDARD VIII

AN AIR MEDICAL SERVICE MUST STRIVE FOR FULL INTEGRATION INTO EXISTING EMERGENCY MEDICAL SYSTEMS AND INTER-HOSPITAL TRANSFER NETWORKS.

STANDARD IX

AN ORGANIZED AND STRUCTURED PLAN MUST BE DEVELOPED TO ACCESS THE AIR MEDICAL SERVICE, PROVIDE FLIGHT FOLLOWING AND COMMUNICATE PERTINENT DATA BETWEEN REQUESTING AGENCY, AIRBORNE FLIGHT CREW AND RECEPIENT AGENCY.

STANDARD X

A PROFESSIONAL AND COMMUNITY EDUCATION PROGRAM SHALL BE DEVELOPED THAT WILL PROMOTE PROPER AIR MEDICAL SERVICE UTILIZATION.

STANDARD XI

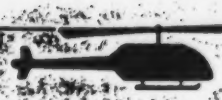
THE AIR MEDICAL CREW WILL APPROACH THE MISSION WHERE HAZARDOUS MATERIAL IS SUSPECTED OR KNOWN TO EXIST IN SUCH A MANNER SO AS TO ENSURE THE SAEFTY OF THE CREW AND AIRCRAFT AS THE PRIMARY CONSIDERATION. A STRUCTURED PROGRAM FOR RESPONDING TO THE PATIENT(S) INVOLVED IN A HAZARDOUS MATERIAL INCIDENT MUST BE IN PLACE, WITH POLICIES AND PROCEDURES CLEARLY OUTLINED AND AVAILABLE FOR THE PILOT AND MEDICAL CREW PRIOR TO LIFT OFF.

Provider members will recieve a complete copy of the Standards & Safety Guidelines upon acceptance of membership. Other members & interested parties may purchase a copy from the AAMS National office. The cost is $25.00 per copy.

APPENDIX O

AAMS SAFETY

Association of Air Medical Services



SAFETY

The following Safety Guidelines,presented here in outline form, have been developed by the Association of Air Medical Services to serve as reference for the development and continuing operation of an air medical service. These Safety Guidelines are intended to assure the quality of patient care and the safety of both crew and patient(s).

ROTORCRAFT

GUIDELINE I

WEATHER: **THE AIR MEDICAL HELICOPTER OPERATING VFR MUST ESTABLISH WEATHER MINIMUMS BASED ON THE TOPOGRAPHY OF THE SERVICE AREA AND WEATHER HISTORY KNOWN TO EXIST IN THE AREA.**

GUIDELINE II

PILOTS: **THE HELICOPTER PILOT, FLYING AIR MEDICAL MISSIONS, MUST CALL UPON MANY RESOURCES, EXPERIENCES AND SKILLS. THE MISSION FREQUENTLY INVOLVES NIGHT FLYING AND UNPREPARED LANDING SITES. THE PILOT SHALL BE SUMMARILY PREPARED,CERTIFIED AND TRAINED.**

FIXED WING

GUIDELINE II-A

PILOTS: **THE NATURE OF THE AIR MEDICAL MISSION REQUIRES THAT THE AIRCRAFT AND PILOT BE MISSION-READY SO AS TO BE ABLE TO MOVE A MEDICAL CREW, PATIENT, SAFELY AND EXPEDITIOUSLY.**

ROTORCRAFT

GUIDELINE III

MAINTENANCE: **THE HELICOPTER MECHANIC IS VITAL TO MISSION READINESS.**

National Office 35 S Raymond Avenue Suite 205 Pasadena, California 91105 (818) 793-1232

GUIDELINE IV

AIRCRAFT: **THE AIRCRAFT MUST HAVE APPROPRIATE EQUIPMENT IN ORDER TO ASSURE THE MAXIMUM SAFETY OF THE AIR MEDICAL CREW AND PATIENT(S).**

GUIDELINE V

HELIPAD: **THE HELIPAD MUST BE DESIGNED AND LOCATED SO AS TO FACILITATE THE SAFE AND EFFECTIVE TRANSFER OF PATIENTS.**

GUIDELINE VI

COMMUNICATIONS: **A DESIGNATED PERSON MUST BE ASSIGNED TO RECEIVE AND DISPATCH ALL REQUESTS FOR AIR MEDICAL SERVICES.**

GUIDELINE VII

MEDICAL CREW: **ALL AIR MEDICAL CREW MEMBERS MUST BE TRAINED AND CAPABLE OF PERFORMING PROGRAM MISSIONS.**

GUIDELINE VIII

PRE-HOSPITAL AND HOSPITAL PERSONNEL: **THE AIR MEDICAL SERVICE MUST OFFER SUFFICIENT TRAINING AND EDUCATION TO ENSURE SAFE CONDUCT AROUND THE HELICOPTER BY ALL POTENTIAL USERS.**

Provider members will receive a complete copy of the Standards & Safety Guidelines upon acceptance of membership. Other members & interested parties may purchase a copy from the AAMS National office. The cost is $25.00 per copy.

APPENDIX P

AAMS NOVEMBER 89 CONFERENCE AGENDA

Infection Control in the Air Medical Environment
Katherine West, R.N.

Controversies in Interventional Cardiologies — Thrombolysis and Beyond
John Field, M.D. & Robert Fromm, M.D.

Trauma for Two — Practical Approaches to the Pregnant Trauma Victim
Marge Zerbe, R.N.

MANAGEMENT TRACT SESSIONS

Specialty Teams — Their Place in the Industry
Randy Bury, Moderator

Physical Standards for Flight Crews
Paul Davis, Ph.D., Mike Goodwin, P.A. & Elihu York, M.D.

The Autonomous Flight Team — Dollars vs. Sense
TBA

Starting a New Fixed Wing Air Medical Service: A Focus on Operators, Teams, Aircraft Selection, Budgets and Safety
Rod Crane

Air Medical Transport in Rural America
John Chew, Moderator

The Evolution of Modern Fixed Wing Interiors and the Ergonomics of Dedicated Medical Aircraft
John K. Melcher

The Development of Safe Standards for Fixed Wing Air Medical Operators: A Review of the New EMS/Airplane Advisory Circular
Dick Russell

Dealing with the Media
Gary Roberts, Moderator

OPERATIONS TRACT — COMMUNICATIONS SESSIONS

Public Relations — Fine Lines of Communication
Diane Gorvin & Gary Roberts

Fixed Wing Communications — Where Do I Start?
David McIntire

You've Survived — Now What?
Harry Patz

Intermediate Computer Update
Cheshire Cole

Overview ACS Training Course
Becky Bruckner, Scott Diedreich & Sam Martin

Hazardous Materials in Air Medical Operations
Michael Vance, M.D.

OPERATIONS TRACT — PILOT SESSIONS

IFR EMS Helicopter Operations
Al Majors & Dan Norman

Aeronautical Decision Making — Part I
Jack Thompson

The Limits of Safety
Nick Lappos

The FAA National Aviation Safety Inspection Program (NASIP): Purpose, Findings and Potential Impact on Fixed Wing and Helicopter Air Medical Operations
Benjamin Tollison

Pilot Liability
J. Scott Hamilton, Esq.

Qualification, Training, and Development of the Professional EMS Pilot
Matt Coffey, Ron Reimers & James R. Sineath

Appendix Q

Ontario Air Ambulance Accidents 1980 to July 1989

Aircraft Type: PA23AZ **Date: 21/08/80** **Location: WAWA**

THE AIRCRAFT WAS ON A MEDICAL EVACUATION IFR FLIGHT TO WAWA WHICH IS SERVED BY AN UNCONTROLLED AIRPORT IN UNCONTROLLED AIRSPACE. WHEN THE PILOT ESTIMATED HIS POSITION TO BE CLOSE TO WAWA HE REQUESTED AND WAS GIVEN THE LATEST AIRPORT WEATHER IN WHICH THE CEILING WAS ESTIMATED TO BE 1200 FT AGL (2100 FT ASL). THE PILOT HAD INITIATED A DESCENT THROUGH CLOUD AND AT ABOUT 1700 FT ASL, WHILE STILL IN CLOUD, TREES WERE OBSERVED OUT THE SIDE WINDOW. FULL POWER WAS APPLIED AND A CLIMB COMMENCED BUT THE AIRCRAFT BEGAN STRIKING THE TREES. THE CRAFT TRAVELLED THROUGH THE TREES FOR APPROX 400 FT BEFORE IT STRUCK THE GROUND AT A POINT 33 MI SHORT OF DESTINATION.

THE FLIGHT WAS PILOT SELF-DISPATCHED. THE PILOT STATED HE HAD RECEIVED A WEATHER BRIEFING PRIOR TO THE FLIGHT WHICH WAS FLOWN ABOVE CLOUD AT 7000 FT ASL. THE MOCA FOR THE ROUTE IS DESIGNATED AS 2000 FT ON THE COMPANY FLIGHT PLAN. THE PILOT SELECTED AN ALTERNATE FORECAST TO BE USED FOR PUBLISHED ALTERNATE LIMITS FOR THE PERIOD. ADDITIONALLY, THE CARRIER'S OPERATING CERTIFICATE DID NOT CONTAIN APPROVAL FOR IFR FLIGHT OUTSIDE OF CONTROLLED AIRSPACE BETWEEN THUNDER BAY AND WAWA NOR DID IT HAVE AN AUTHORIZED IFR APPROACH TO THE WAWA AIRPORT.

THE AREA TO THE WEST OF WAWA ALONG THE NORTH SHORE OF LAKE SUPERIOR IS NOTED FOR ITS LOW STRATUS CEILINGS, FOG AND LOW VISIBILITIES. THE AREA IS PARTICULARLY CONDUCIVE TO THESE CONDITIONS WHEN A SOUTHERLY FLOW OF MOIST AIR PASSES OVER THE COLD WATER OF THE LAKE THEN RISES OVER THE HILLS ALONG THE NORTH SHORE. THESE CONDITIONS PREVAILED ON THE MORNING OF THE ACCIDENT.

THE FLIGHT WAS IN UNCONTROLLED AIRSPACE WHEN IT APPROACHED WAWA AND WAS NOT OBSERVED ON RADAR. TEN MIN PRIOR TO THE ACCIDENT SAULT RADAR ADVISED THE PILOT THAT WAWA NOW HAD A FUNCTIONAL VORTAC AND PASSED HIM THE FREQUENCY OF THE NAVIGATIONAL FACILITY. THE VORTAC HAD BEEN COMMISSIONED BY NOTAM 4 WKS EARLIER BUT WAS NOT YET PICTORIALLY DISPLAYED ON THE LO CHARTS. THE PILOT CONTINUED NAVIGATING WITH SOLE REFERENCE TO HIS ADF BEARING NEEDLES WHICH WERE TUNED TO THE WAWA PRIVATE NDB. HE DID NOT UTILIZE THE VORTAC TO ASSIST IN DETERMINING THE AIRCRAFT'S POSITION, FURTHERMORE, DISTANCES FROM THE FACILITY WOULD NOT HAVE BEEN AVAILABLE TO HIM DUE TO AN UNSERVICEABILITY IN THE AIRCRAFT'S DME.

BASED ON THE WEATHER HE LAST RECEIVED THE PILOT HAD INTENDED TO POSITION THE AIRCRAFT OVER THE LAKE AS HE HAD DONE ON A PREVIOUS FLIGHT TO WAWA AND TO CONDUCT AN EN ROUTE DESCENT THROUGH CLOUD, ANTICIPATING BREAKING OUT BELOW CLOUD ABOUT 1000 FT ABOVE THE WATER.

IN THIS INSTANCE HOWEVER, THE PILOT MISCALCULATED HIS POSITION RELATIVE TO WAWA AND THE LAKE. HE DESCENDED IN CLOUD, TO BELOW THE MOCA, AND STRUCK HIGH TERRAIN WHICH ROSE 1200 FT ABOVE THE LAKE SURFACE AT A POINT 4 MI INLAND FROM THE NORTH SHORE OF THE LAKE.

THE AIRCRAFT WAS EQUIPPED WITH AN ELT BUT THE BATTERIES HAD BEEN REMOVED IN ACCORDANCE WITH EXISTING DIRECTIVES. THE AIRCRAFT AND SURVIVORS WERE LOCATED THE FOLLOWING DAY AFTER ONE OF THE SURVIVORS IGNITED THE WRECKAGE TO PRODUCE A SIGNAL FIRE.

Aircraft Type: 500 **Date: 15/12/84** **Location: SIOUX LOOKOUT**

The aircraft was being operated on a medical evacuation flight to transport a two-year-old patient to Sioux Lookout. Following a missed approach, the crew attempted another landing on runway 34. The aircraft landed on the second attempt but could not be stopped on the runway, and it came to rest 200 feet past the 300-foot stopway. The nose and left main landing gear were damaged when the aircraft struck a drainage ditch. The main left gear also punctured the upper wing surface when it was driven upward by the impact. The occupants of the aircraft, including the patient who was held in an attendant's arms, were uninjured.

FINDINGS:

Cause Related:

1. Braking action was extremely poor because of freezing precipitation on the runway.
2. A JAI measurement was not taken before the aircraft landed, and the crew relied on a pilot's report given 35 minutes previously.
3. Because the aircraft touched down 2,000 feet down the runway, it could not be stopped in the remaining landing distance available and continued past the runway end during the roll-out.
4. The speed brakes were inoperative when the aircraft was dispatched and hence not available.

Other:

1. The runway conditions were below standard for aircraft operations.

Aircraft Type: 100 Date: 29/11/88 Location: CHAPLEAU

~~WHILE PROCEEDING TO THE SCENE TO COMMENCE~~ THE APPROACH, GROUND COMMUNICATION ~~WAS SUDDENLY LOST. AIRCRAFT WRECKAGE WAS~~ FOUND 1 MILE SOUTHWEST OF AIRPORT.

WHILE COMMENCING APPROACH, GROUND COMMUNICATION WAS SUDDENTLY LOST. A/C WRECKAGE WAS FOUND 1 MILE SOUTHWEST OF AIRPORT.

Aircraft Type: MERIIB Date: 04/03/89 Location: KIRKLAND LAKE

AIRCRAFT LANDED AND DURING ITS LANDING ROLL VEERED OFF TO THE LEFT AND STRUCK A SNOWBANK.

DURING LANDING ROLL, A/C VEERED OFF RUNWAY AND STRUCK A SNOWBANK.

Aircraft Type: Piper Navajo Chieftain Date: 24/06/89 Location: PELEE ISLAND

Under Investigation

Aircraft Type: BK 117 Date: 28/01/89 Location: BUTTONVILLE

Under Investigation

Bibliography

DOCUMENTS RECEIVED

TRAINING:

Aircraft orientation Bandage II	YZ CHC
Medic orientation S 76	YZ CHC
Survival and Ditching course CHC	YZ CHC
RN Orientation program	LL 3
Anatomy of an air evacuation	BC

FORMS:

Pilot information sheet	MAN
Quality assurance chart audit I & II	MAN
Telephone log	MAN
Captain's trip report	MAN
Out of province transport	MAN
Aircraft accident/incident report CHC	YZ CHC
Safety briefing CHC	YZ CHC
On site assessment of commercial aircraft MNR	YZ MOH
Inspection Report MOH	YZ MOH
Air Ambulance Contract Aircraft Operator Inspection Manual	YZ MOH
Flight following	LL 3
Customer satisfaction survey	LL 3
Patient satisfaction survey	LL 3
Initial call information	LL 3
Assignment of benefits	LL 3
Load Manifest and information sheet	LL 3
Flight critique	LL 3
Helicopter currency checklist nurses	LL 3
Clinical skills inventory nurses	LL 3
Database worksheet (computer inputs and score keeping)	LL 3
Trauma pack checklist	LL 3
EMS General and specific information	LL 3
Air charter company review report	BC
Dispatch record	HQ MOH
Air Ambulance Service Invoice	HQ MOH
Report of an investigation of an aircraft acc./inc.	CASB
Air Ambulance Call Report	HQ MOH
Air Ambulance Service Invoice charter	HQ MOH

CHARTS:

Emergency Health and Ambulance Services Division	MAN
Air and Radio Services Branch	MAN
Organization	LL 3
Quality assurance committee/reporting structure	LL 3
Quality assurance process flow	LL 3

POSITION DESCRIPTIONS:

District Air Ambulance Manager Buttonville '85	YZ MOH	
(Letter answering Grievance Buttonville)		YZ MOH
Critical Care Attendant - Buttonville	'84	HQ MOH
Base Supervisor - Buttonville	'old	HQ MOH
Manager Air Ambulance Dispatch Control Centre	'83	HQ MOH
Supervisor Resources Control	'82	HQ MOH
Operations Supervisor Air Ambulance Section	'?	HQ MOH
Manager Air Ambulance Unit	'84	HQ MOH
Operating Manager - C.A.A.C.C	'88	HQ MOH
Contracts Auditor - charter a/c & helicopters	'?	HQ MOH
Emergency Medical Air Ambulance comm. coordinator	'88	HQ MOH

STATISTICS:

Air Ambulance Patient Transfers		HQ MOH
Call volume by base, dedicated, charter	'82 to '88	HQ MOH
Patient data - requests and carried		MAN
Breakdown by age and code		MAN
Breakdown by service		MAN
Physician escorts		MAN
In/Out of province		MAN
In province referring/receiving centres		MAN
Out province referring facilities		MAN
In province receiving facilities		MAN
Aircraft utilized		MAN
Average time for in province transport		MAN
Escort utilization profile Buttonville		YZ MOH
Crew members transports		LL 3
Missed business totals		LL 3
Helicopter Time study		LL 3
Year to date totals by originating hospital		LL 3
Year to date totals by destination hospital		LL 3
Year to date totals by referring physician		LL 3
Year to date totals by service		LL 3
Non patient transport activity		LL 3
Charter inc./acc. twin eng.a/c and heli.	ONTARIO '79-'89	CASB
Charter accidents twin eng.a/c and heli.	ONTARIO '76-'89	CASB
Air Ambulance incidents	ONTARIO '80-'89	CASB
Air Ambulance accidents	ONTARIO '76-'89	CASB
Number of calls per month and per year	'80 to may '89	HQ MOH
Air Ambulance call priorities dedicated & charter	'85	HQ MOH
Air Ambulance call priorities Timmins	'88	HQ MOH
Air Ambulance call priorities Sioux Lookout	'88	HQ MOH
Air Ambulance call priorities Sudbury	'88	HQ MOH
Air Ambulance call priorities Thunder Bay	'88	HQ MOH
Air Ambulance call priorities Buttonville	'88	HQ MOH
Air Ambulance call priorities Total helicopters	'87	HQ MOH

STANDARDS:

The Ambulance Act and revision to regulation 14	HQMOH
The Ambulance Services Act	July 85
MAN	
The Ambulance Services Act - Regulation 300/88 filed August 22, 88	MAN
Flight Nurses Policy Manual	MAN
Standards Fixed Wing	AAMS
Standards Rotorcraft	AAMS
Fixed wing Air Medical standards 1989	AAMS
Advisory Circular Emergency Medical Services-Airplane(EMS/A)	FAA
Operations Manual - Pilot in command	LL 3
Operations Manual - Carriage of dangerous goods	LL 3
EHS - AEROMED EVAC.- A guide to transporting patients June 88	BC
Rules and Regulations - Pennsylvania bulletin Vol 19, July 89	LF
Weather Minimums	LF
Weather Status - Green/Yellow/Red	LF
CACC Manual of Operational Policy and Procedure (excerpts)	HQ MOH
DOT Airworthiness Staff Instruction No. 32 - 15 April 84	TC
FAA AC 67-1 Medical Information for Air Ambulance Operators	FAA

CRITERIA:

Flight criteria	LL 3
Candidates	LL 3
RFP EHS Air evacuation aircraft BC	
Life Flight guidelines	LF
Standing Offer Charter Air Ambulance Transport Service	HQ MOH
RFP Dedicated Air Ambulance Service Fixed Wing	HQ MOH
RFP Dedicated Air Ambulance Service Rotary Wing	HQ MOH
Information and Utilization guide	HQ MOH
Criteria codes 1 to 4	HQ MOH
Terms of reference Provincial advisory committee	HQ MOH
Sample: minutes of Provincial advisory committee	HQ MOH
Terms of reference District advisory committee	HQ MOH
Sample: minutes of District advisory committee	HQ MOH
Aircraft Inspection from Draft Manual Policy and Procedures	HQ MOH
Comments by H. Brown on MNR Mandatory Standards and Requirements	HQ MOH
Spot and Annual Charter Audit/Inspection Report	HQ MOH
Proposal Evaluation for Sioux Lookout Dedicated Service	HQ MOH
Ontario Hydro Aircraft Audit Evaluation	Ont Hydro
Proposal Comparison for Dedicated Fixed wing aircraft	HQ MOH
Proposal Request Form for fixed and rotary wing aircraft	HQ MOH
Management Board Submission FIR Ambulance Fixed Wing - Sioux Lookout and Timmins	HQ MOH

PLANS

Post accident/incident	LL3

GENERAL

Information manual for specialty medical teams & ambulance		MAN
Fact sheet		LL3
Publicity publications X2		LL3
Publicity Aeromedical research & education centre AREC		LL3
Photos King Air Interior		LL3
Photos S 76		LL3
University of Manitoba Medical bulletin winter '88		
Memo to AAMS - Newsletter June 30/89		LL3
Memo to AAMS - Minutes and plans Nov 10/88		LL3
Memo to AAMS - F/W activities Mar 2/89		LL3
BC Air Ambulance service		BC
Publicity folder - Ambulance service		BC
Photos S 76 & Ground Ambulance		BC
Emergency Health Service - Newsletters		BC
Health Emergency Act - EM Assistance regulation		BC
INFOBACK - crash claims three lives	Jun '89	HQ MOH
INFOBACK - destroyed by fire	Jan '89	HQ MOH
INFOBACK - crashes in Chapleau	30 Nov '88	HQ MOH
INFOBACK - crash in Chapleau	1 Dec '88	HQ MOH
INFOBACK - Timmins	5 Deb '88	HQ MOH
INFOBACK - Timmins Jet Air	19 Jan '89	HQ MOH
INFOBACK - Better comm. needed	31 Mar '89	HQ MOH
Statement by Minister - Pelee Island	26 Jun '89	HQ MOH
Emergency Health Services Literature Review		HQ MOH
Data derived from "Air Ambulance Patient Transfer Reports"	HQ MOH	
CAACC staff employment		HQ MOH
CAACC staff changes		HQ MOH
Various grievances and reports		HQ MOH
List of charter operators		HQ MOH
Extract from Minister's Briefing Book Jul 31, 1989, EHS Branch		HQ MOH

SAFETY:

Safety guidelines	LL3
Safety concepts and human factors affecting performance	LL3
Poster - Helicopter landing and safety rule	LL3
Quality assurance program; an overview	LL3
Hypothermia; recognition, prevention and treatment	LL3
A matter of survival	LL3
Management of Hypothermia	LL3
Emergency treatment of Hypothermia	LL3
Aircraft safety seminar - course outline	BC ANDERSON
Safety articles	BC ANDERSON
Computer printout - notams, helipad info, nv, freqs	LF
Article - The cost of air Medical Helicopter Programs	HQ MOH
Article - Aeromedical Accidents Trends	HQ MOH
Article - Accidents plague air ambulance industry	HQ MOH
Article - Pilot remembers pain of fatal decisions	HQ MOH
Article - Easy answers elude aeromedical industry	HQ MOH
Article - No contest: Canadian safety record overpowers US	HQ MOH

REPORTS:

Direction for the development of emergency health services in Ontario	- Discussions paper #1	Part 1	HQ MOH
	- Part III Health services chap 7 Base hospitals		HQ MOH
	- Part III Hospitals emerg. chap 7 Base hospitals		HQ MOH
	- Part III Hospitals ember. chap 9 Critical care		HQ MOH
Inter-Hospital Patient Transpcrtation			HQ MOH
Inquest into deaths at Chapleau crash			HQ MOH